

MAY 1995  
Volume 63 No 5

# AMATEUR RADIO



*Journal of the Wireless Institute of Australia*



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- \* Singing the Sunspot Blues
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Wireless Institute of Australia 1995

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## Cover

One of our best-known authors, Lloyd Butler VK5BR, can sometimes be found at the operating desk, but probably is even happier in his test lab (not in the photo, but only one metre to the right!). Beginning in 1983, when he was some years from retirement from the Defence Science and Technology Organisation, Lloyd has written about 60 articles for Amateur Radio magazine, on a wide range of topics.

Photograph by Bill Rice VK3ABP

## Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Member of the International Amateur Radio Union

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## Editor's Comment

### Letters Received

Most of the material that arrives here addressed to "The Editor" fits into its particular category with no problem. Letters mostly go into "Over to You", regular columns slip straight into place, technical articles go to the Technical Editors, and so on.

But there are exceptions, usually in the form of letters too long for publication in "Over to You", and apparently seeking a personal reply from me. More often than not they need a good deal of editorial research before an answer can be given. They cannot be dealt with in five minutes, so they fall into the mythical "too hard" basket. Others fall on top of them and soon they are "snowed under". Time passes.

However, several such recent letters have refused to lose themselves, and probably the best way of doing them justice is here and now.

To begin, VK4CGO comments on the March "Editor's Comment" ("Publication Delays"). He assumes it was serious (yes, it was), and asks what is the hobby of amateur radio really about that we seem to be a "commercially based radio activity", with a magazine "topical, without bias, in no way offensive", with preferred input on computer disk and professionally drawn diagrams.

We can sympathise with his concern about "commercially based", particularly regarding the age-old controversy between "home-brew" and "bells and whistles". But, if members are to build their own from our published designs, they must be much more than scribble and sketches. Almost all of our regular contributors already submit their copy on disk.

Then there was a letter in "Over to You" back in January from VK1PBT, who complained that *Amateur Radio* carried too little material for Novices or beginners generally. We had to admit that, since Ron Cook VK3AFW stopped writing "Novice Notes" some years ago, the complaint was somewhat justified.

"Doc" Wescombe-Down VK4CMY (who used to write a Novice Column with Rodney Champness VK3UG even further back in time) volunteered to "start up" again. But so did Peter Parker (now VK1PK, ex VK6BWI), full of enthusiasm and bright ideas. He even called on VK1PBT and persuaded him to rejoin the WIA. So thanks to "Doc" for volunteering, but you've already done your bit and more! Peter's column should start in a couple of months from now.

Finally, a letter from VK8NSB looked at things from the viewpoint of a Novice in Darwin. He's full of enthusiasm to upgrade and already prefers CW at 20 plus wpm, but is having some trouble with AOCP theory. Keep plugging away, Stuart, and I'm sure some of the locals will help where they can. Perseverance eventually wins.

Bill Rice VK3ABP  
Editor

ar

# WIA News

## WIA Action Over Licence Fees

Misinformed criticisms and allegations over Federal WIA actions in regard to the SMA's Inquiry into Apparatus Licensing and the subsequent determination of amateur licence fees have been circulated within the Divisions and on the packet radio network recently.

While the strident language and the repeating of clearly inaccurate and speculative statements used debased the credibility of the statements, some amateurs and Institute members have sought to build the credence of these criticisms

and allegations by frequent repetition.

One baseless allegation made was that Federal WIA representatives at the 5 December liaison meeting with the SMA accepted the SMA's proposed fees and "...agreed to help sell the fees to the amateurs."

The Federal WIA and its SMA Liaison representatives never "accepted" the fees proposed by the SMA last December, nor agreed to help "sell" them to amateurs.

The WIA News insert to the January issue of *Amateur Radio* simply reported the facts of the statements made by the SMA at the 5 December 1994 meeting, without

Institute comment. The text of that release was circulated to all Divisions, to the amateur radio and electronics press, and put on the packet radio network on 15 December 1994.

Within a day, a number of packet radio operators were suggesting amateurs write to members of Parliament. The following Sunday, 18 December, news of the proposed fees was on Divisions' broadcasts.

On 30 December 1994, taking advantage of the holiday's "slow news" period, the Federal WIA issued a press release to the general print and electronic media, resulting in wide press coverage in January of amateurs' early objections to the new fees regime, in particular the spectrum access tax.

The purpose of this release was to publicise the issue to amateurs and other interested people who are not

## WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

| Division | Address  | Officers  |                            | Weekly News Broadcasts  | 1995 Fees   |
|----------|--|---|----------------------------|---|---|
| VK1      | ACT Division<br>GPO Box 600<br>Canberra ACT 2601<br>Phone (06) 247 7006  | President Rob Apathy<br>Secretary Len Jones<br>Treasurer Don Hume   | VK1KRA<br>VK1NLJ<br>VK1DH  | 3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 3.570 MHz FM and 438.525 MHz FM.  | (F) \$70.00<br>(G) (\$) \$56.00<br>(X) \$42.00                          |
| VK2      | NSW Division<br>109 Wigram Street<br>Parramatta NSW<br>(PO Box 1066<br>Parramatta 2124)<br>Phone (02) 689 2417<br>Freecall 1800 817 644<br>Fax (02) 633 1525 | President Michael Corbin<br>Secretary Pixie Chappie<br>Treasurer Peter Kloppenburg<br>(Office hours Mon-Fri 11.00-14.00<br>Mon 1900-2100) | VK2PFQ<br>VK2KPC<br>VK2CPK | From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 ("morning only) with relays to some of 14, 160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2m, 70 cm, 23 cm. Voicemail highlights on (02) 724 8793. The broadcast text is available on packet. | (F) \$66.75<br>(G) (\$) \$53.40<br>(X) \$38.75                          |
| VK3      | Victorian Division<br>40G Victory Boulevard<br>Ashburton Vic 3147<br>Phone (03) 885 9261<br>Fax (03) 885 9298  | President Jim Linton<br>Secretary Barry Wilton<br>Treasurer Rob Halley<br>(Office hours Tue & Thur 0830-1530)                             | VK3PC<br>VK3XLZ            | MONTHLY BROADCAST on the second Sunday of the month, starts 1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz, 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday 146.700 Mt Dandenong, 147.250 Mt Macedon, 147.225 Mt Baw Baw, and 2 m FM(R)s VK3RMA, VK3RSB, VK3ROW, 70 cm FM(R)s VK3ROU and VK3RGL. Major news update call VK3WI on Victorian packet BBS.                       | (F) \$72.00<br>(G) (\$) \$58.00<br>(X) \$44.00                          |
| VK4      | Queensland Division<br>GPO Box 638<br>Brisbane QLD 4001<br>Phone (074) 96 4714   | President Lance Bickford<br>Secretary Rodger Bingham<br>Treasurer VK4HD   | VK4AZZ                     | 1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz, 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday 146.900 FM(R)s VK3RMA, VK3RSB, VK3ROW, 70 cm FM(R)s VK3ROU and VK3RGL. Major news update call VK3WI on Victorian packet BBS.   | (F) \$72.00<br>(G) (\$) \$58.00<br>(X) \$44.00                          |
| VK5      | South Australian Division<br>34 West Thebarton Road<br>Thebarton SA 5031<br>(GPO Box 1234<br>Adelaide SA 5001)<br>Phone (08) 352 3428                        | President Garry Herden<br>Secretary Maurie Hooper<br>Treasurer Charles McEachern  | VK5ZK<br>VK5EA<br>VK5KDK   | 1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATC Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555, 7065, 10125, 146.700, 0900 hrs Sunday   | (F) \$72.00<br>(G) (\$) \$58.00<br>(X) \$44.00                          |
| VK6      | West Australian Division<br>PO Box 10<br>West Perth WA 6872<br>Phone (09) 434 3283   | President Cliff Bastin<br>Secretary Ray Spargo<br>Treasurer Bruce Hedland-Thomas  | VK6LZ<br>VK6RR             | 146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.  | (F) \$60.75<br>(G) (\$) \$48.60<br>(X) \$32.75                          |
| VK7      | Tasmanian Division<br>52 Connaught Crescent<br>West Launceston<br>TAS 7250<br>Phone (003) 31 9606  | President Andrew Dixon<br>Secretary Robin Harwood<br>Treasurer Terry Ives   | VK7GL<br>VK7RH<br>VK7ZTI   | 146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.593 at 1930 hrs  | (F) \$69.00<br>(G) (\$) \$55.65<br>(X) \$40.00                          |
| VK8      | (Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).   |   |                            | Membership Grades<br>Full (F) Pension (G)<br>Needy (G) Student (S)<br>Non receipt of AR (X)   | Three-year membership available to (F) (G) (X) grades at fee x 3 times. |

Note: All times are local. All frequencies MHz.

members of the WIA, don't have access to packet radio, don't frequent radio club meetings or may not have heard the issue discussed on the bands. It certainly succeeded (see "WIA action on proposed licence fees", *WIA News*, February Amateur Radio).

The Federal WIA acted very quickly to first publicise as widely as possible the proposed fees and amateurs' objections to them. On 3 January 1995 the SMA demanded an explanation from the WIA for its actions in publicising the issue and Federal President Neil Penfold VK6NE wrote to the Spectrum Manager, Christine Goode, the next week seeking a specific meeting for the WIA to negotiate with the SMA on the licence fees.

Before a reply was received, Neil Penfold was approached on 2 March by an adviser to the Minister for Communications, Michael Lee, seeking to arrange a meeting between the WIA and the government. A meeting with the Parliamentary Secretary to the Minister for Communications, Paul Elliott, was arranged for Monday, 6 March, and confirmed on Friday, 3 March.

That invitation was sparked by a number of things, including the barrage of letters to MPs from amateurs around Australia, and an on-air interview on the ABC Queensland regional radio network between presenter David Anderson and Paul Elliott, who explained the SMA's position on amateur licence fees, followed by an interview between David Anderson and WIA Vice Chairman Roger Harrison VK2ZRH, who comprehensively rebutted the arguments put by Paul Elliott.

Another baseless allegation made was that, at that meeting on 6 March, the Federal WIA representatives, Roger Harrison VK2ZRH and David Wardlaw VK3ADW, "reached or agreed on" a fee with Paul Elliott. *No fee level was either discussed or negotiated*. So, it was impossible to agree to anything, either.

As reported in *WIA News* in the March issue of *Amateur Radio*, it was Paul Elliott who met with the SMA subsequent to the 6 March meeting

and negotiated the \$51 flat fee which he announced in Parliament late in the evening of 8 March. The Federal WIA was only advised of the new flat fee and sent official confirmation on 9 March. The Spectrum Manager, Christine Goode, wrote to Federal President Neil Penfold on 9 March, responding to his January letter, advising of the new \$51 flat fee and suggesting a meeting. That meeting took place on 27 March, in Perth.

Neil Penfold sought clarification of beacon and repeater licence fees during that meeting. The results of WIA-SMA consultations over beacon and repeater licence fees are covered in another *WIA News* release.

Further baseless allegations regarding WIA representations on licence fees claimed the WIA had been "...mucking around with this since December 1993".

Nothing could be further from the truth. In September 1990, and again in July 1991, the Federal WIA made submissions to the House of Representatives Standing Committee on Transport, Communications and Infrastructure (HORSCOTCI). The first submission was to the HORSCOTCI *Inquiry into management of the radio frequency spectrum*, and the second was in response to the HORSCOTCI discussion paper, *Issues and options in radio frequency spectrum management*.

In each instance, the WIA's concerns over how the amateur radio service was licensed, and might be licensed in the future, and the charging of licence fees were raised in the submissions. Objections were raised to commercial price-based or market type setting of fees.

The SMA's discussion paper on Apparatus Licensing, dated December 1993 but not issued until late January 1994, sought public response, with a deadline of 15 March 1994. The Federal WIA made a submission to the SMA covering six major points (reported in *WIA NEWS* in 1994), including consideration for the "perceived social value" of the Amateur Radio Service, and applicability of Class Licensing. Two Divisions also made their own submission, that from the NSW Division specifically raising the fees issue, saying that a survey of

members indicated they would rather see fees fall or not go above the then \$36 level.

In a scheduled WIA-SMA Liaison meeting on 16 June 1994, Paul Palmer of the SMA explained a number of matters regarding the Apparatus Licence inquiry, but no new information on the matter of fees was put forward. However, it was explained that there would be no Class Licence for amateurs.

On 22 September, in response to rumours circulating about increased licence fees, the Federal WIA wrote to the SMA expressing concern that "...in the SMA's reviewing of Apparatus Licences a formula is being applied to Amateur Radio Licences which may result in increased licence fees".

The submission comprehensively outlined the value of WICEN in assisting community emergencies, the educative role of the annual Scout and Guide "Jamboree of the Air", and the Amateur Service's role in experimentation and technical development.

It concluded with "I trust the value of amateur radio to the community, youth, aged, disabled and Australia is taken into account when the new structure of fees is set in place and that Australia aligns with those other nations who have recognised the value of amateur radio and set their licence fees accordingly".

At the scheduled WIA-SMA Liaison meeting on 28 September 1994, Paul Palmer of the SMA again presented information on Apparatus Licensing and fees. He said Class Licences had been introduced for the CB and 27 MHz handphone services and reiterated information on how Apparatus Licence fees were to be determined. No information other than that previously released in the SMA discussion paper was divulged. However, Mr Palmer did say to the WIA that he thought amateur licence fees might rise "a bit".

No further details on amateur licence fees were forthcoming from the SMA until the proposed fees were divulged to the WIA on 5 December 1994. Between October and December 1994, the SMA Liaison Officer, Gavan Berger VK1EB did raise concerns on the matter during

informal discussions with SMA officers, but no information was provided until the matter was put on the agenda for the 5 December meeting, which was notified the previous week.

### Amateur Beacon and Repeater Licence Fees

In a letter Christine Goode wrote to Federal President Neil Penfold VK6NE on 9 March, which confirmed the government's decision to apply a flat amateur licence fee of \$51, the Spectrum Manager indicated that beacons and repeaters would be licensed "on an assigned frequency basis, with fees determined in accordance with the standard fee table".

At a meeting arranged with the Spectrum Manager, Christine Goode, on 27 March in Perth, Neil Penfold raised the matter of amateur beacon and repeater fees, seeking further clarification.

She replied promptly on 31 March, advising that, "for an amateur repeater or an amateur beacon licence the spectrum access tax and

spectrum maintenance charge components of the licence will be derived from the new formula which takes account of spectrum location, geographic location, area of coverage and bandwidth.

"For most such licences, the bandwidth would be between 0 Hz and 36 kHz, and they will therefore attract the minimum spectrum access tax and the minimum spectrum maintenance charge, amounting to around \$13.

"The total fee for the issue of such a licence (involving frequency assignment) would be this amount plus the issue charge, calculated on the basis of an hourly rate," Christine Goode explained.

The SMA's hourly rate charge is currently \$91.

Her letter went on, "The renewal charge for such a licence would be around \$11, giving a total annual fee at renewal of \$24".

Christine Goode also acknowledged the WIA's foreshadowed submission to Paul Elliott, the Parliamentary Secretary to the Minister for Communications and the Arts.

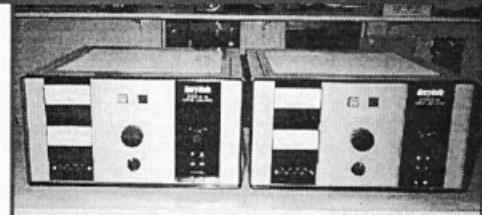
The same day the licensee of the Perth Amateur TV Group's repeaters (VK6RTV), Brian Pilcher VK6TTV, received a little shock — a renewal notice for \$8,938.85! The form RF 284 ("Offer to Renew, Radiocommunications Apparatus Licence[s]") listed a spectrum access tax of \$6,799.89, spectrum maintenance charge of \$2,039.96 and renewal charge of \$99.

Confirming the renewal by fax on Monday, 4 April, WIA Vice Chairman Roger Harrison VK2ZRH sent a fax to Spectrum Manager, Christine Goode, asking if the fee for VK6RTV was correct, as well as seeking further clarification of her advice of 31 March.

In addition to asking about the fees for VK6RTV, the following questions were put to the Spectrum Manager:

- Many voice repeater installations have several channel pairs operating under the one licence at the one site. Does the SMA propose that each channel pair attract the \$24 fee?
- Alternatively, does the SMA propose that each discrete frequency attract the \$24 fee?

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- What is the SMA's role when the beacon and repeater applications are pre-processed by each state's WIA Technical Advisory Committee to ensure compliance with amateur band plans?
- Under the system outlined in your letter, what would be the expected range of fees to issue a new amateur voice or data (packet) repeater licence?

A reply by Friday, 7 April was requested.

On 6 April, a reply from Peter Stackpole, for the Spectrum Manager Christine Goode, advised that "The fee indicated on the computer generated renewal notice for VK6RTV...is not correct and the Spectrum Management Agency is investigating the problem". He included a copy of a letter, dated 4 April, to Don Graham VK6HKH, advising that the SMA was reviewing the charges for the Perth ATV Group repeater.

"Further advice on the actual fee level and the methodology for determining the fee will be provided as soon as the investigation is completed," he said.

The next day, 7 April, another letter from Peter Stackpole confirmed that the SMA had "resolved the anomaly" and that the renewal fee of \$24 "applies to amateur television repeaters as well as to narrow band repeaters and beacons," adding that "SMA area offices will adjust any anomalous fees when licensees renew".

In both letters, of 6 and 7 April, Peter Stackpole advised that the initial fee for repeaters and beacons will be charged at an hourly rate of \$91, with a minimum fee of \$45.40 for a half hour. He explained that it reflects the work involved by SMA staff to conduct frequency assignment compatibility checks and that, while the SMA recognised the importance of the coordination role of the WIA's state Technical Advisory Committees, the SMA is still required to perform various technical compatibility checks to ensure the potential for interference from or to nearby commercial users is minimised.

However, each beacon or repeater, once licensed, will attract an annual

re-issue fee of \$24 per transmitter, but any associated links are covered by that one transmitter licence.

During informal discussions with SMA officers on the matter, Federal President Neil Penfold ascertained that a simple beacon or repeater application might take less than an hour's work for the SMA to check the assignment, while a more complex application might take up to a few hours. The WIA understands that initial fees might range from under \$90 up to several hundred dollars.

The SMA was first asked about the matter of initial beacon and repeater fees by the WIA's SMA Liaison Officer, Gavan Berger VK1EB, back on 5 December at the scheduled WIA-SMA liaison meeting at which the then-proposed amateur licence fees were first divulged. Followed-up in January and February with SMA officers, but the letter from Christine Goode of 31 March was the first time concrete information was supplied by the SMA. However, the SMA did reply promptly to the WIA's questions faxed on 3 April.

### **Lower Fees With Five Year Licences**

As foreshadowed in the WIA News insert in the January issue of *Amateur Radio* magazine, the Spectrum Management Agency (SMA) will shortly introduce five year terms for Apparatus Licences which will afford discounted fees and options for a single up-front payment or instalment payments over a period.

Instalment payments may be made annually over the five years.

The necessary legislation went through the House of Representatives in the Spring session, during March. It is to go before the Senate in the session which commences on 9 May.

It is expected that five year terms for Apparatus Licences (under which amateur stations are currently licensed) will be introduced by or before mid year.

For a five year licence, payment will be discounted by subtracting the value of four re-issue costs from the annual fee multiplied by five. The re-issue fee, as advised by the SMA, is currently \$11.

Under the foreshadowed

arrangements, a five year amateur licence would thus be five x \$51, or \$255, less four x \$11, or \$44 — making the five year fee \$211.

If you then elect to pay in annual instalments, you would be paying \$42.50 a year, or just \$5.20 above the old \$37 annual licence fee, a difference of 14%.

The catch is, the onus will be on the licensee to pay on the anniversary of the first payment (no renewal notices will be issued), or within 60 days of the anniversary, or risk being liable for any amount remaining together with a penalty payment, or even cancellation of the licence. In other words, the legislation reflects normal commercial debt arrangements.

### **Representation Makes a Difference**

WIA representation has gained some official recognition for the Amateur Radio Service in the final draft of the Australian Radiofrequency Plan, released late in January.

The Spectrum Plan is a table of frequency band allocations covering the radio spectrum from 9 kHz to 400 GHz, which specifies the general purposes for which the bands may be used in Australia, alongside provisions of the International Telecommunications Union (ITU) Radio Regulations band allocations for the three world regions.

The Spectrum Plan is the prime document used when making frequency allocations for radiocommunications services in Australia and is legally binding on the Spectrum Management Agency in making decisions on use of the radiofrequency spectrum. Late in 1994, the preliminary draft Spectrum Plan was circulated to the members of the International Radiocommunications Advisory Committee (IRAC). The WIA is represented on this committee by International Study Group coordinator, David Wardlaw VK3ADW.

Working in conjunction with Federal Technical Advisory Committee (FTAC) Chairman, John Martin VK3KWA, and SMA Liaison Office, Gavan Berger VK1EB, David Wardlaw drafted comments which were forwarded to the SMA.

Subsequently, the WIA was invited

to a special meeting in Canberra to discuss these comments with the SMA. That meeting was also attended by representatives from other organisations who had commented, who were — the Federation of Australian Commercial Television Stations (FACTS), Telecom and Defence.

The WIA sought to have ITU footnotes to the international table of allocations and the words "amateur-satellite" added to the Australian allocations table in the Spectrum Plan to "...make it much clearer to people using the table as to where the amateur-satellite allocations are..." in the bands between 148 MHz and 10 GHz (all of which are allocated to the Amateur Service in Australia on a secondary basis).

The particular ITU footnotes are FN 664, which delineates amateur-satellite use on a secondary basis in the bands 435-438 MHz, 1260-1270 MHz (Earth-to-space only), 2400-2450 MHz, 3400-3410 MHz (Regions 2 and 3 only) and 5650 to 5670 MHz (Earth-to-space only), and FN 808 which delineates amateur-satellite use on a secondary basis in the 5830-5850 MHz band (space-to-Earth).

The final draft Spectrum Plan included the "amateur-satellite" annotation and the footnotes in all the appropriate places in the table.

The WIA also suggested noting in the Spectrum Plan proposed secondary amateur allocations at 160-190 kHz and 3700-3900 kHz, and a note that the broadcasting service in the 45-52 MHz band would be phased out. However, these suggestions were not incorporated.

Additional comments from the WIA regarding matters in the spectrum Plan's preliminary explanations on Class Licensing, Broadcasting Service use of other bands on a secondary basis, and secondary use of bands by atmospheric and ionospheric sounders, bore some fruit, as explanatory notes on these matters were added to the final draft Spectrum Plan.

Having representation in the right places has paid off for the Amateur Radio Service in Australia.

## Other Spectrum Users Object to Licence Fees

The Surf Life Saving Association (SLSA), the Volunteer Coast Guard Association (VCGA) and volunteer firefighter groups are to fight the Spectrum Management Agency's new licence fees for their radio equipment.

A report in *The Australian* newspaper on 12 April said, "Surf Lifesaving Australia and other volunteer rescue associations face hundreds of thousands of dollars in new annual government levies on their radios, which are used in rescues".

The report said the SLSA had calculated that its 260 clubs were collectively up for \$80,000 in "maintenance" and "administration" fees for the clubs' 1200 hand-held radios.

The SLSA and VCGA, along with volunteer firefighters, said they were preparing to fight the fees, which they cannot pay.

The general manager of the SLSA, Dennis Heussner, said they were not about earning profit, they were about saving lives and it would not be possible to conduct rescues without their radio equipment. He estimated the new fees would add more than \$300 to each club's annual costs.

The Spectrum Manager, Christine Goode, reportedly commented that radio licence fees had been restructured to make them fairer and remove anomalies, and that the figures mentioned were worst-case nightmares and unlikely to eventuate.

The newspaper report said volunteer rescue groups are exempt from annual licence fees and taxes, but the SMA wrote to the groups in March saying that they would not be exempt from new "cost recovery" fees. Rural radio users and community radio stations would pay less in licence fees, said Christine Goode.

However, the technical consultant to the Community Broadcasters Association of Australia (CBA), David Sice, told the WIA in late March that, although some licence fees for their operations had been discounted 43%, the way the new Apparatus Licence fees regime was being applied would result in an increase in

total fees payable by many community broadcasting stations.

The CBAA objected to the Spectrum Access tax component of their licence fees, supported by the Broadcast Industry Advisory Council (BIAC) and the Australian Federation of Consumer Organisations (AFCO). They said it was inappropriate to apply this tax to non-profit community groups, many of whom were supported by government grants. They said it was "ludicrous" for such groups to have to use taxpayers' money to pay taxes back to the government.

## UHF Amateur Bands Earmarked for Spectrum Licensing

The 23 cm and 13 cm amateur bands have been earmarked as "potentially suitable" for commercial spectrum licensing, according to a new discussion paper, *Implementing Spectrum Licensing*, released by the Spectrum Management Agency (SMA) in the first week of April.

The 100-page booklet actually contains two discussion papers and was scheduled for release last February. As a consequence of the delay, the original deadline date of 21 April for public consultation has been changed to 26 May.

In a letter accompanying a copy of the booklet, sent to WIA Vice Chairman Roger Harrison VK2ZRH, the SMA's manager — Spectrum Marketing, Ian Hayne, said the first discussion paper "...sets out the SMA's plans for introducing spectrum licensing and the types of measures that we anticipate will be applied to allow spectrum licensing to operate".

The second paper, he said, "...opens discussion about the bands that the SMA could recommend to the Minister for Communications and the Arts for allocation to spectrum licensing.

"Before making a recommendation to the Minister, the SMA is required to give members of the public a reasonable opportunity to make representations about the sort of recommendation it should make."

In its introduction to the discussion papers, the SMA explains the differences between Apparatus

Licensing and Spectrum Licensing. Apparatus Licensing is about authorising equipment for a particular frequency, geographic location and use, whereas "Spectrum licensing, instead of focusing on equipment and its uses (which in turn defines the area covered and the frequency bandwidth used), authorises the use of spectrum within specific limits of frequency bandwidth and coverage area.

"Under spectrum licensing, licensees will have the flexibility to change their equipment, antenna, siting, in fact any aspect of their use of spectrum, provided they comply with the core technical conditions of the licence, and any coordination requirements."

This reads rather like a prescription for amateurs' use of their spectrum bands!

The second discussion paper in the booklet lists in a table 132 bands, from 39 MHz through 3100 MHz, considered as suitable or unsuitable for spectrum licensing. A total of 83 of the 132 bands are listed as "potentially suitable" for spectrum licensing, including the 1260-1300 MHz segment of our 23 cm band, and the 2400-2450 MHz, or 13 cm, band.

The 148-149.9 MHz paging band, immediately above the two metre

amateur band, is also earmarked as potentially suitable for spectrum licensing. The booklet explains that this band is well suited as, although there are a large number of assignments, there is a much smaller number of paging service operators, with many national services.

"Trading and subdividing, as provided by spectrum licensing, could help facilitate change in the paging market to satisfy demand from some paging service operators for greater coverage. There may also be demand from other compatible uses," the booklet says.

In respect to the 13 cm band, the booklet says, "The 2300-2450 MHz band contains MDS [multipoint distribution service — pay TV] Group B licensees. The small number of operators, combined with the commercial competitive nature of the uses of this band suggests that it is well suited to spectrum licensing."

MDS currently has the 2300-2400 MHz segment, which was recently withdrawn from the Amateur Radio Service which had secondary user status in the band 2300-2450 MHz. Amateurs retain secondary service status in the 2400-2450 MHz band, which is still designated internationally as an "Industrial, Scientific and Medical" (ISM) band.

The WIA is planning to respond to the *Implementing Spectrum Licensing* discussion papers.

It has been WIA policy for some years to seek some primary segments for amateur radio in the bands between 148 MHz and 10 GHz where we only have secondary service status at present.

While the WIA has not had any positive response on this matter to date from the SMA, it will be vigorously pursued in forthcoming discussions.

The next WIA-SMA Liaison meeting, originally scheduled for 1 May, has been postponed by the SMA to 17 May so that all the required SMA people will be available to attend.

Meanwhile, US amateurs have gained primary status in segments of the 13 cm band. The Federal Communications Commission (FCC), in reallocating segments of this band, elevated amateurs to primary status in the segments 2390-2400 MHz and 2402-2417 MHz, which they will share with unlicensed, low-power "personal communications service" (PCS) digital devices, which are now a secondary user. (Thanks to *The ARRL Letter* 13 February 1995. ar

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## ■ Transceivers

# "TCF" Sideband/CW Transceiver for 40 Metres

Drew Diamond, VK3XU\*

Here are details of a 40 metre version of the TCF transceiver. Transmitter and receiver sections have individual circuit boards, so these may be built as separate items (with small adaptions), or in stages, as desired. The prototype has the following measured characteristics:

### Receiver

|                         |  |
|-------------------------|--|
| Frequency Range:        | Nominally 7.0 to 7.250 MHz.                |
| Sensitivity:            | 0.5 $\mu$ V for 10 dB S+N:N.               |
| Reception Modes:        | SB, CW, DSB and AM (as SSB).               |
| Image Rejection:        | 70 dB.                                     |
| IF (4 MHz) Rejection:   | 60 dB.                                     |
| Incremental Tune (RIT): | Nominally +/-3 kHz.                        |
| Frequency Stability:    | Less than 100 Hz in any hour after warm-up |
| Spurious Signals:       | One sub-microvolt spur at 6.998 MHz        |

### Transmitter

|                      |   |
|----------------------|---|
| Frequency Range:     | Same as receiver.                         |
| Power Output:        | At least 2 W, typically 3 W into 50 ohms. |
| Modes:               | SSB (LSB) and CW.                         |
| Carrier Suppression: | 35 dB.                                    |
| USB Suppression:     | 35 dB.                                    |
| Harmonics and Spurs: | At least -55 dB at full output.           |
| Frequency Stability: | Same as receiver.                         |
| Load Tolerance:      | Withstands any load SWR without damage.   |
| Power Supply:        | +12 to +13.8 Vdc at up to 1 A.            |

### Circuit

The receiver section is in the lower half of the schematic. The VFO and crystal oscillator, which are common to both the receiver and transmitter, are shown in the centre. The transmitter is in the top portion.

An IF of 4 MHz was found by experiment to produce the cleanest transmit signal, and most spur-free reception, using cheap computer crystals. Complexity is greatly reduced by having identical Twin Crystal Filters (TCF), one each for transmit and receive functions.

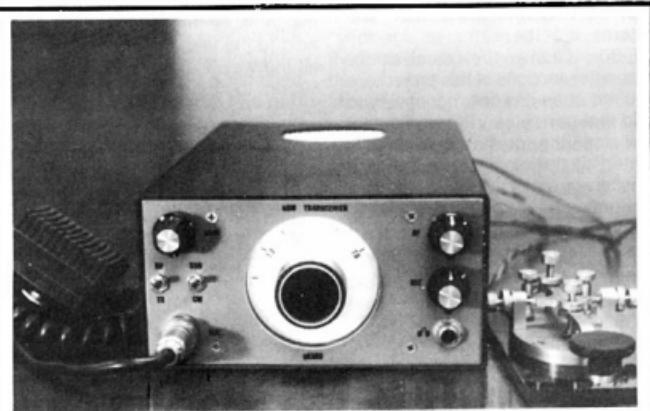
### Receiving

Signals in the 7.0 to 7.25 MHz range are admitted via the top-coupled band pass filter and applied to one of the NE602 inputs of the receive mixer. The VFO is adjustable from 11.0 to about 11.25 MHz, and is injected into the oscillator port at pin 6. The wanted product, the IF at 4 MHz, must negotiate the 4-crystal ladder filter, whose bandwidth is determined by the value of the five coupling capacitors; 33 pF yields a bandwidth of about 1.8 kHz.

The filtered 4 MHz signal is again presented to an NE602 as the product detector. Crystal derived oscillator (BFO) signal at about 3.9995 MHz is applied to the oscillator port at pin 6. The 4.0 MHz oscillator crystal is pulled about 500 Hz low with a 10  $\mu$ H coil to place it on the lower edge of the crystal filter bandpass, thus providing reception of LSB signals on SSB (the polarity of the sideband is reversed by the VFO mixing process), and single-signal reception of CW signals. The low level audio product is applied to a conventional '741/386 audio amplifier to power a speaker or 'phones.

The NE602 was designed originally by Signetics for mobile radio applications, and has a 500 MHz input bandwidth. To keep unwanted VHF signals out of the set, the receive signal is routed via the transmitter's low-pass filter.

For CW operation, and to allow for small netting errors on SSB, incremental tuning is provided on receive with a diode and capacitor at the source tap of the VFO tank coil. The effective value of capacitance is



TCF 40 Transceiver.

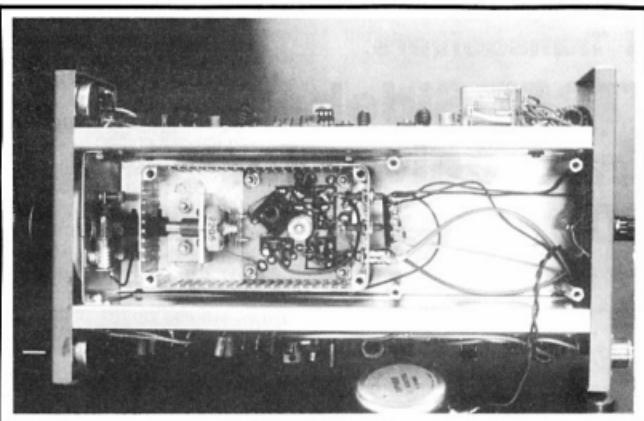
altered by varying the forward current through the diode. A 470 ohm resistor sources the diode on transmit from the regulated +6 V which powers the balanced modulator, and thereby biases the diode to the same nominal current level as at the mid point of the 1 kohm offset pot, which is sourced on receive from a separate +6 V regulator (the 7806 chips provide a very stable 6 V supply at these low current levels).

### Transmitting

Microphone audio is amplified and applied to pin 2 of an NE602 wired as a balanced modulator (input pins 1 and 2 are interchangeable, as are the output pins 4 and 5). "Carrier" at about 3.9995MHz is applied to pin 6. The normally good balance is upset at audio rate, thereby producing double sideband (DSB) at the output of the balanced modulator. Static DC conditions of the '602 may be altered with high value resistors and a trimpot connected between pins 1 and 2, thus allowing for accurate carrier balance adjustment. For CW operation, the '741 mike amplifier is unpowered, and balance is upset by inclining one side of the '602 input to ground. Rise/fall time constant is determined by the value of C at pin 1, 1  $\mu$ F, and series R, 22 kohm, resulting in click free CW keying. Back-wave on CW is about the same as carrier suppression at -35 dB.

The DSB or CW signal emerging at pins 4 and 5 is applied to a second crystal filter, which passes the USB only, the LSB being greatly attenuated. Another '602 doing transmit mixing duty has the VFO output applied at the oscillator port where our 4 MHz SSB or CW signal is heterodyned as follows; 11.0 — 4 = 7.0 MHz, 11.25 — 4 = 7.25 MHz. Once again, the VFO mixing process inverts the sideband polarity from USB to LSB, the convention for 40 m SSB.

The resulting SSB or CW signal is raised in discrete increments through a three stage linear amplifier to about 2 W. A seven pole low pass filter cleans up any harmonics which may be (and probably are) present at the drain of the output power MOSFET.



VFO and dial assembly (speaker removed).

### Construction

Equipment required includes the usual electronics hand tools, drill-press (not essential), multimeter (preferably digital), power meter/load (or lamp), 40 m receiver, frequency counter and/or general coverage receiver.

The set must be housed in a metal box so that external RF fields cannot enter and cause instability problems. My aluminium made "shoebox" measures 285 x 163 x 85 mm. Good rigidity and compactness is obtained by using three internal sub-chassis panels as shown. Most components are accommodated upon three home-made circuit boards, which are receiver, VFO and transmitter. The patterns are the same as for the TCF-80. If only the receiver, or transmitter sections of this project are required, then it is only necessary to build that part, plus VFO and crystal oscillator (the crystal oscillator is located on the receiver board). As a transceiver project, it is suggested that items should be constructed in the order of VFO, power supply (if required), receiver, then transmitter.

Constructors generally agree that a home-made VFO should be housed in a metal box, preferably die-cast. In addition to RF shielding, the thermal time constant of the box is so long that the oscillator components are effectively buffered from any short term temperature excursions. A further useful degree of isolation may

be had by mounting the assembly upon insulating material, or insulated spacers.

The VFO tank coil is wound on a standard 7.5 or 8 mm (5/16") former; the kind with four or six tags is ideal. Drill a 1 mm hole across the diameter of the former, 23 mm from the base. Uncoil about 1 m of 22 B&S wire from your spool, then fix the spool in a vice. Solder the wire to the tag corresponding to the ground end of the coil (check the circuit board layout). Whilst maintaining tension on the wire, walk towards the vice and wind on five turns, then pull out sufficient wire to twist up a little pig-tail loop, which is the source tap. Now wind on the remaining 20 1/2 turns, making sure that each turn lies right next to the last, maintaining tension all the way. Cut the wire with about 50 mm to spare, then carefully (this is the tricky part) poke the wire through the 1 mm hole, then pull through to keep tension on the coil. Solder the "hot" end of the coil to the appropriate tag. The coil should be coated with Q-Dope (TM), Estapole (TM) or shellac.

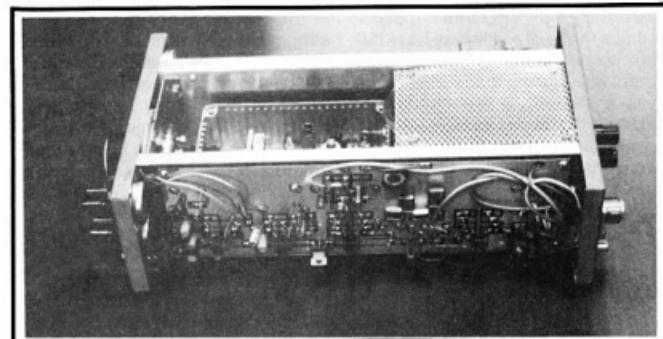
Variable capacitors of any kind are hard to buy new, although the resourceful builder can generally locate something to suit (in my opinion, without great care, varactor diodes do not offer the high Q and stability required, whereas a good variable capacitor is the best and simplest part for the variable element in a VFO). The capacitor shown is

one of those well-made ceramic insulated screwdriver adjust 8 pF units with a home-made 1/4" adaptor fitted to the ferrule. If greater than 250 kHz range is required, employ (say) a 10 or 12 pF.

Now this is important! For a quality VFO, use the best constructed variable capacitor that you can find, NPO, polystyrene, or silver mica capacitors in the VFO tank (do not use cheapo "mystery" ceramics, and avoid the tiny little NPOs — physically larger caps have more thermal mass), and an air dielectric "beehive" trimmer. Improved stability is generally obtained if the fixed C part for the tank is made up of more than one capacitor. The prototype required 18 pF worth of N750 (negative 750 parts per million/ $^{\circ}\text{C}$ ) for very acceptable stability. See Ref 7 for further VFO notes. The components associated with RIT may be located on a small 4-tag strip soldered to the feedthrough capacitor which carries RIT current into the VFO box.

The frequency dial consists of a disc of 3 mm opaque perspex, machined in a drill press using a tank-cutter. A hole-saw would also serve. Temporarily fix a bolt and nut through the resulting centre hole, and reduce the disc diameter by mounting it in the chuck and applying a flat file to the outer edge of the rotating disc. The clear perspex "window" has slightly larger diameter than the dial disc, and is fitted into the front panel. By the same method, but with the file tilted, put a slight taper on the outer diameter of the window disc so that it is a nice friction fit into the front panel. The planetary drive is mounted upon a right-angle formed in a sub chassis. To take up any small misalignment, the drive should be connected to the variable capacitor with an insulated flexible coupler. A short length of 6.35 mm (1/4") inside diameter rubber fuel hose clamped between drive and capacitor is a workable second best. The dial disc may be illuminated with a 12 V/100 mA dial lamp placed so that light is radiated through a 10 mm hole from behind. A cursor line is formed by positioning a length of wire between lamp and dial, thus projecting a line onto the dial.

With care, there is just room behind



**Chassis assembly.**

the VFO for an internal power supply, although an external supply is recommended. If accidental wrong polarity is possible (eg battery), connect a 1 A diode in reverse across the power input terminals, and series connect a 2 A fuse between positive battery supply and the set.

Bifilar broadband transformers T1, T2 and T3 are made as follows; take two 300 mm lengths of 24 B&S wire. Twist together at one end, and clamp that end in a vice. Twist the free ends together, and clamp in the chuck of a hand drill. Whilst maintaining tension, turn the drill until you have about three twists per cm, then pull the drill to set the pair. Now carefully loop the pair onto an Amidon FT50-43 core. About 11 loops should fit comfortably. Snip the ends leaving about 2 cm free. Remove about 1 cm enamel from each wire, and with a meter on ohms, identify the "windings". For T2 and T3, connect the end of one winding to the start of the other as shown on the circuit. Most toroidal transformers and coils are self-supporting. However, if additional support is required, they may be fixed to the board with a small blob of non-acid silicone glue.

Several different brands of crystals were tried for the crystal filters and oscillator. Cheapest price (in lots of ten, we need nine and a spare would be handy) and satisfactory performance was obtained with units branded Vigor from Tec's Computers (see Parts). For best chance of success, it is suggested that you use these also. In any event, try not to mix different makes of crystal in any one filter.

The IRF511 output amplifier must have an effective heatsink. A rectangular hole is cut in the circuit board so that the MOSFET may sink excess heat directly into the chassis. Remember to fit insulating hardware at the device/chassis interface. A solder tag under the mounting nut provides the drain connection. The source pin is soldered direct to the foil, then drain and gate pins are bent up at right angles to clear the board.

Although it may be useful to have an in-built ammeter to monitor the PA drain current, meters are rather expensive and, once the standing current bias has been set up, there is rarely need to touch it again. The current drawn by the remaining circuitry (excluding dial lamp) is small. So, if the power supply is external, and has its own meter, then none is required for the transceiver. In the absence of a metered supply, a 0.1 ohm resistor (or two paralleled 0.2s) in series with the drain supply line allows us to connect a multimeter across it and check the current. 100 mA will therefore cause 0.01 V to be dropped, 800 mA drops 0.08 V, and so on. A 3 or 4-digit DMM will read these values.

## **Alignment**

### **Receiver**

The VFO range must first be verified. If a counter is available, simply connect the VFO to the counter input and measure the frequency. (Note that, if checking the VFO as a "stand-alone" assembly, in order to fully test the unit we should hay-wire the RIT components and 7806 regulator(s) into circuit and replace the cover).

Adjust the 25 pF VFO trim capacitor so that a range of a little less than 11.0 MHz to just over 11.25 MHz is generated. Check that the RIT pot gives a smooth receive frequency adjustment of about 3 kHz each side of mid pot travel. Under normal conditions, ten minutes of warm-up operation should have the device generating a satisfactorily stable signal. If, for some reason, the correct VFO range cannot be obtained, change one of the fixed tank capacitors, larger or smaller as required.

No counter? Listen for the VFO signal on a general coverage receiver and adjust as described above. A short clip lead inserted in the VFO output connector should radiate a detectable signal. With the perspex window removed, the dial may be calibrated by applying rub-on numbers onto the opaque disc at (say) 50 kHz increments.

Connect an antenna to the input. Peak the two 55 pF trim capacitors at the receiver input filter for best sensitivity/flatness across the band. The receiver should be responsive. At moderate loudness, SSB and CW signals should sound clean, without perceptible distortion or hum.

#### Transmitter

Set the MOSFET bias pot for minimum voltage, the balanced modulator pot to mid-range, and the VFO to 11.1 MHz (to produce 7.1 MHz). Connect the output to a 50 ohm dummy load (a 12 V/250 mA lamp will do). Disconnect any dial lamp if you are doing your current measurement with a power supply ammeter. Select CW mode, and switch to send. Adjust the MOSFET bias voltage so that something less than about 100 mA of standing (no signal, or "idling") drain current flows, ie class B operation. Close the Morse key. Current should increase. Adjust the 55 pF trim capacitors at Tx Mix and the collector tank of the 2N2222 amplifier for maximum RF output. Current should now be about 800 mA, giving about 2 to 3 W RF output across the band. Open the key. Whilst listening to the signal on another receiver, adjust the balanced modulator pot for carrier null. You should obtain a clearly defined null as the carrier is balanced out. The signal

at the test receiver must not be so strong that the null is masked. Keyed CW should have a pure note, with no clicks, chirps or ripple.

Switch to SSB mode. Plug in a radio type PTT dynamic microphone. Whilst talking, increase the mike gain pot until the drain current flicks up to about 800 or 900 mA on voice peaks. Listen to the SSB signal on another receiver (don't headphones to avoid feedback). It should sound clean, and be free of splatter, clicks, hum, or other unpleasant noises. If an oscilloscope is available, view the RF waveform. It should have nicely rounded peaks, without bright spots anywhere on the envelope, and no significant "carrier" with mike gain at minimum.

Set the RIT pot to mid travel. On transmit, measure, as precisely as you can (preferably with a DMM), the voltage at the junction of the two 1N914s. Now switch to receive. Adjust the RIT pot to read exactly the same voltage, then slacken off the RIT knob grub screw and position the pointer to a calibration mark at 12 o'clock. Transmit and receive frequencies will now be the same at the nominal mid point of the RIT pot.

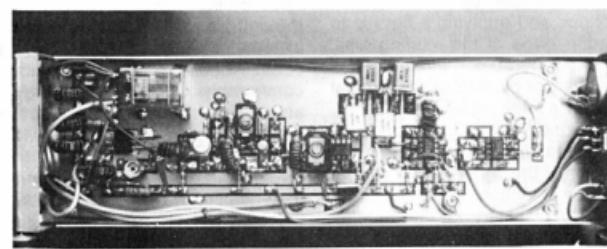
In actual use, when contact has been established with another station, any necessary receive frequency adjustments must be made with the RIT pot, leave the main VFO control untouched. When operating CW, about 1 kHz RIT offset will be necessary to obtain a pleasing "beat note".

#### An After-Burner

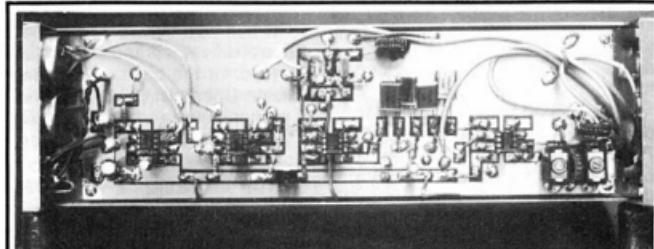
Two watts into a dipole antenna should yield good interstate (and possibly NZ) SSB and CW contacts, although the going may sometimes be rough under poor conditions. As a follow-on project, the output power may be raised with a linear amplifier. One similar to the 25 W job described in Ref 6 is suggested, with the addition of a relay with two sets of change-over contacts to by-pass the amplifier during receive.

#### Parts

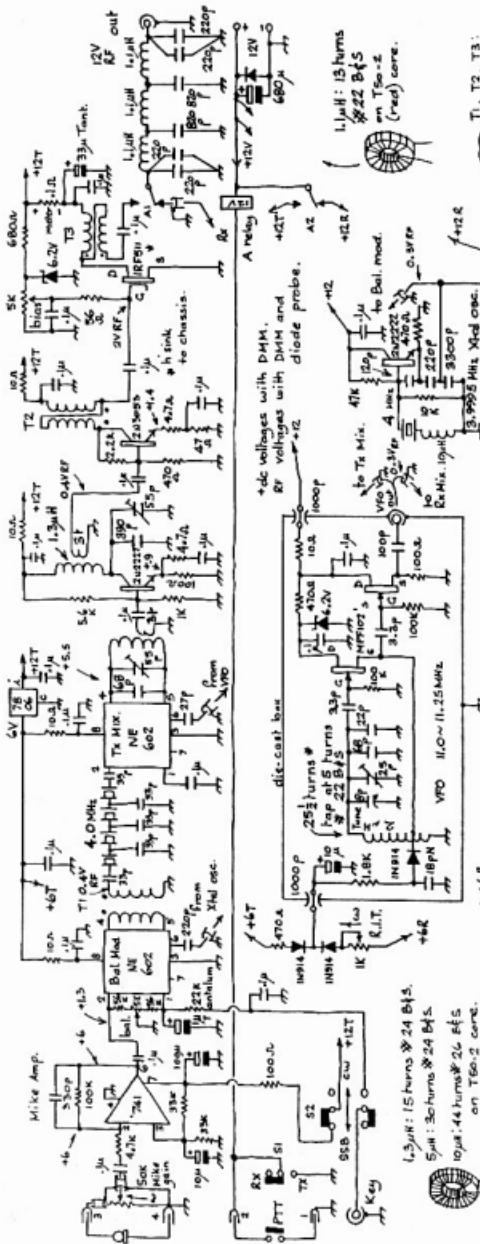
All conventional components are available from the usual electronics suppliers. The crystals were purchased from Tec's Computers (03) 562 9501. In addition, radio type components, including Amidon cores and trim caps may be ordered from Stewart Electronics (03) 543 3733.



Transmitter board.



Receiver board.



602,741,386.  
  
 All  $\frac{1}{16}$  are  
 monolithic  
 602,741,386.

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- 6 -

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"TCF" SSB/CW TRANSCIEVER FOR 40M  
— VK3XU '94

Daycom (03) 543 6444, Truscotts  
 Electronic World (03) 723 3860 and  
 Electronic Disposals (03) 723 2699.  
 Amidon suppliers also advertise in  
 the Hamads of this journal. Some  
 perspex vendors will supply small off-  
 cuts; look up perspex in your local  
 Yellow Pages. Dick Smith can supply  
 a planetary reduction drive for the dial  
 (but check for adequate shaft length).

#### Disclaimer

Apart from being an ordinary  
 customer, the writer has no  
 connection with any firm mentioned  
 herein, nor has he gained any  
 "freebies" for naming them.

#### **More Information**

Please write to me at my home  
 address if you would like more  
 information, including circuit board  
 artwork and component location  
 diagrams. Some relevant DC and RF  
 voltages are shown on the circuit to  
 aid in any necessary troubleshooting.  
 Voltages which differ greatly should  
 indicate the problem area. If, after  
 earnest efforts, you cannot get your  
 project to work satisfactorily, please  
 write, and all reasonable assistance  
 will be gladly returned. An  
 appropriately sized SASE would be  
 appreciated.

#### **References and Further Reading**

1. NE602 Primer — Carr, *Elektor Electronics*, Jan '92.
2. Sideband Can Be Simple! — Price, G4BWE, *Rad Com*, Sep '91.
3. A Miniature SSB Transceiver — Grierson, G3TSO, *Rad Com*, June/July '91.
4. QRP SSB/CW Transceiver for 14 MHz — Hayward, W7ZOI, *QST*, Jan '90.
5. Designing and Building Simple Crystal Filters — Hayward, *QST*, July '87
6. 25 W MOSFET Linear Amplifier — Diamond, VK3XU, *Amateur Radio* Jan '91.
7. Some Practical Tips on VFO Construction — Diamond, *Amateur Radio* Jan '88.
8. "TCF" SSB/CW Transceiver for 80 m, *Amateur Radio* Oct '93.
9. Multi-band Phasing Transceiver — Hey, *Rad Com* July-Aug '93.
10. The "Tiny Tim" 3.5 MHz SSB Transceiver — Walford, *Practical Wireless* July-Aug. '93.

#### **Parts List for the "TCF" 40 m Transceiver**

|  |            |   |
|--|------------|---|
| <u>Capacitors all 16 V or greater</u>  | <u>Qty</u> |   |
| 3.3 pF NP0 (black spot)                | 2          | NE602AN   |
| 10 pF NP0                              | 2          | LM741   |
| 8 pF variable (see text)               | 1          | LM386   |
| 18 pF N750 (violet spot)               | 1          | 7806/1 A regulator chip   |
| 25 pF "beehive" air trimmer            | 1          | 6.2 V/400 mW zener  |
| 27 pF NP0                              | 2          | 1N4148 or 1N914 diode   |
| 33 pF NP0                              | 10         |   |
| 68 pF NP0                              | 1          |   |
| 55 pF compression mica trimmer         | 4          |   |
| 120 pF poly or ceramic (second choice) | 1          | Miscellaneous   |
| 220 pF poly or ceramic (second choice) | 7          | Case to suit, or sheet aluminium to make, die cast box approx 122 x 41 x 66 mm, Amidon T50-2 cores (8), FT50-43 cores (3), Vigor 4.0 MHz crystal (9, all identical), 6 or 4-pin 8 mm bakelite coil former, dial drive, coupler, perspex, 12 V lamp & holder, 8-pin DIL wire wrap sockets (7), single or double-sided circuit board material, speaker, mike socket, antenna coax connector, phones socket, key socket, RCA plug and socket for VFO, power supply terminals, knobs, 12 V relay with two sets of c/o contacts, miniature SPST and DPDT switches (one each), miniature 50 ohm coax, chassis items including IRF511 mounting hardware, screws, nuts, washers, and VFO spacers. |
| 330 pF ceramic                         | 1          | "Nar Melan" Gatters Road, Wonga Park, VIC 3115  |
| 390 pF ceramic                         | 1          |   |
| 560 pF ceramic                         | 1          |   |
| 820 pF poly or ceramic (second choice) | 2          |   |
| 1000 pF feedthrough                    | 2          |   |
| 0.01 μF ceramic                        | 1          |   |
| 0.1 μF monolithic                      | 29         |   |
| 1 μF electrolytic                      | 2          |   |
| 1 μF tantalum                          | 1          |   |
| 10 μF electrolytic                     | 5          |   |
| 33 μF tantalum                         | 1          |   |
| 100 μF electrolytic                    | 4          |   |
| 680 μF electrolytic                    | 1          |   |
| <u>Resistors all 1/4 or 1/2 W</u>      |            |   |
| 0.1 ohm (or two 0.2 ohm)               | 1          |   |
| 1 ohm                                  | 1          |   |
| 4.7 ohm                                | 2          | Dual band Collinear 2M&70cm \$ 95   |
| 10 ohm                                 | 7          | 2M collinear 2 5/8 7dbd \$ 97   |
| 47 ohm                                 | 1          | 12 ele 2M broad B/width \$123   |
| 56 ohm                                 | 1          | 6 M J-pole \$109  |
| 100 ohm                                | 4          | 6 M collin 6 db rad 4.NEW \$157   |
| 470 ohm                                | 3          | 6 ele 6 M N.B.S 50 mm Booms \$296   |
| 680 ohm                                | 1          | Duo 10-15 M \$278   |
| 1 kohm                                 | 1          | 3 ele 15 M \$299  |
| 1 kohm linear pot                      | 1          | 3 ele 20 M \$312  |
| 2.2 kohm                               | 2          | 20 m log-yag array 11.5 dbd \$719   |
| 4.7 kohm                               | 1          | M B Vert NO TRAPS 10-80 M \$265   |
| 5 kohm flat mount trimpot              | 2          | Tri band beam HB 35 C 5 ele \$690   |
| 5.6 kohm                               | 1          | 40 M linear loaded 2 ele \$492  |
| 10 kohm                                | 1          | 13-30 M log/periodic 12 ele all stainless/steel fittings \$915  |
| 33 kohm                                | 4          | 70 cm beam 12 ele bal/Feed \$102  |
| 47 kohm                                | 1          | 23 cm slot fed 36 ele brass cons \$/solder-assembled. 18 dbd \$170  |
| 50 kohm log pot                        | 2          | 80 m top load/cap/hat vert. \$260   |
| 56 kohm                                | 2          | 3 ele 40m l/cap hats 60mm boom \$815  |
| 100 kohm                               | 3          | 2 m 144.100 2.2 wavelength boom \$145   |
| 220 kohm                               | 1          |   |
| <u>Semiconductors</u>                  |            |   |
| MPF102, 2N5457, etc.                   | 2          | <b>PLUS FREIGHT</b>   |
| 2N2222, 2N3904, etc.                   | 2          | <b>BANKCARD MASTERCARD &amp;</b>  |
| 2N3053, BFY50, etc.                    | 1          | <b>VISA ACCEPTED</b>  |
| IRF510, IRF511, MTP4N08 etc.           | 1          | <b>Call ANDY COMAN VK3WH.</b>   |
|  |            | <b>LOT 6 WEBSTERS ROAD,</b>   |
|  |            | <b>CLARKFIELD 3429</b>  |
|  |            | <b>PHONE 054 285 134</b>  |

# ■ Propagation and Predictions? Singing the Sunspot Blues — or, A Conversation with a Minor

Fred Naylor VK3AQN\* looks just a little way into the future.

Nothing to be heard. The third morning and 20 metres still a dead band. The Missouri boys had surely tried to get the news through. With our good gear, their TH7 and my monoband log-Yagi, it used to be easy. Ah well, it's tough times, low in the sunspot cycle.

The phone rang. A friend, impatient with excitement, had a fax and wanted to tell me all that latest news I'd been working and waiting for. Who was it said something about "hopes turning to ashes"?

The humble, everyday fax had left us for dead. Tongue in cheek, I shot off a packet message to the president, my old friend Ernie, WB2UJL:

"G'day, Ernie! Well, it looks as though the old sunspot cycle bottoming out plus sunflares and other disturbances has us beaten! Don't know if the Kansas City boys were able to get conference news together ready for transmission to the land down under, but the 20 metre band at 2200 hrs UTC has sounded as though the antenna cable was cut. Nothing to be heard from any direction. Anyhow, we've been shown up technologically; your common or garden fax doesn't need sunspots, just the phone line — assisted by optical fibres and a satellite or two, of course. Yes, it's consigned our "state of the art" technology to dusty irrelevance.

Reckon I'll still keep the old steam radios though, if only for the curiosity value. Come to look at it now, the radio shack does begin to seem a bit like a museum."

I logged off and stood there despondent, gazing at the equipment. Startled, I saw it appear to change. It took on a dusty aspect and began to resemble the primitive gear of long ago. Why was that? What did it mean?

There was a soft footfall and a touch on my arm.

"What's wrong, Grandpa? You looked confused."

"Yes, I think I'm in a time warp — I don't know whether it's past or present and I've just seen my lovely, modern radio shack turn into a museum piece."

"What are those big boxes with knobs on, Grandpa?"

"They're radios, son; old-time radios — Kenwoods and Yaesus."

"What did you do with them, Grandpa?"

"Why, we used to send messages out into the ether, to be reflected by the ionosphere, and the messages might come down just anywhere."

"You mean you sent out messages you didn't know where, so you could talk to people you'd never met?"

"Yeah...Well...Yeah...Er...Sure."

"It's like taking a sailing ship and hoping the right wind might blow you some place nice, isn't it, Grandpa!"

"Hadn't thought about it like that, son."

"How did you find out about this kind of radio, Grandpa?"

"Well my old Dad, your great-grandfather, first told me about it a long, long time ago."

"Were those the Dark Ages, Grandpa?"

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"Whatever makes you ask that, son?"

"Didn't you believe in a sort of magic? Wasn't it a kind of sorcery — high priests of wizardry sitting in front of their magic boxes, weaving a sort of spell?"

"Well....Yeah....Yeah well, I suppose it was, in a way. A special magic...anybody might pick it up...on a little island far away...someone in the jungle maybe or in a big city...someone you'd never met...maybe friends...kinda romantic."

"Doesn't look very romantic to me, Grandpa, just old grey boxes with black knobs, attached to lots of spiky aluminium sticking up into the sky."

"It was a big world, son, and radio seemed to make it smaller."

"Here's a thing like a lever with a knob on it."

"Ah, that's a Morse key, for switching the transmitter off and on, using a code others far away could read. See — diddidey-dah — that's 'V'."

"Oh, Grandpa, stop kidding! Sounds like a chook pecking corn."

"This conversation is making me more uncomfortable by the minute.



Fred Naylor VK3AQN's very neat station.

Throw the dust covers over 'em, son. Maybe we'll come back and talk about it again, some time."

"OK. Grandpa."

"Let's go out into the sun and the breeze, my boy. It'll blow away some of the cobwebs from my head. I'll put the mobile phone in my pocket; we'll sit on that seat over there in the garden and make a call to your Uncle Matthew in Chicago. Shouldn't take more than about 10 seconds before we hear his voice."

Matthew in Chicago. Shouldn't take

more than about 10 seconds before we hear his voice."

"That'll be fun, Grandpa. Oh, and Grandma says there's a fax from Aunty Win in England. She wants you to reply before she goes out shopping. Is it still a big world, Grandpa?"

4 Oak Avenue, Emerald VIC 3722

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## ■ Technical

# An L of a Network — Part 3

Graham Thornton VK3IY\* wraps up his analysis of the L-Match

### Power Rating

In practice, it is the peak voltage across the capacitor which determines the power rating of the network. The breakdown potential of an air spaced capacitor is about 20 volts per thousandth of an inch. According to our esteemed Editor, Bill Rice VK3ABP, 500 V is the minimum breakdown potential, regardless of spacing. A two-gang broadcast capacitor can be used split-stator fashion, to double the voltage rating, and halve the capacitance. It is intended to describe a paraffin oil

immersed capacitor, capable of withstanding high voltage, in a later issue of *Amateur Radio*.

So what voltage does the capacitor have to stand for a given power output? There are four different places in the network where a capacitor may be used, and the answer depends on which one is chosen. Resolution of the voltage question may help to decide which option to select.

(1) Low resistance output — shunt capacitor input. This is the simplest case, and is independent of the

capacitance. The peak voltage across it will be 100 V for 100 W, and 200 V for 400 W.

(2) Low resistance output — shunt inductor input.

$$\frac{E_{MAX}}{X_{SERNET}} = \sqrt{\frac{2P}{R_{LOAD}}} \text{ amp}$$

$$(P = \text{power (W)})$$

This result is plotted in Figure 11 for both 100 and 400 W.

(3) High resistance output — series capacitor input.

$$E_{MAX} = \sqrt{2P \cdot (R_{LOAD} - 50)} \text{ V}$$

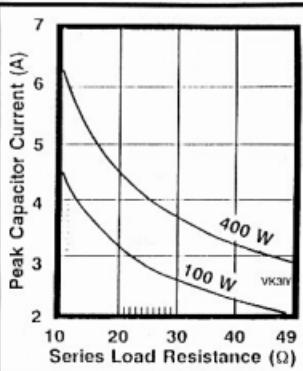
(4) High resistance output — series inductor input.

$$E_{MAX} = \sqrt{2PR_{LOAD}} \text{ V}$$

Figure 12 reveals all for cases (3) & (4).

### System Operating Q

A high Q reduces cross modulation



**Fig 11 — Peak current through series output capacitor — low resistance output (multiply result by reactance of series capacitor to get peak voltage).**

QRN, and helps reduce harmonics, at the price of sharp tuning and the need to re-tune across a band. Unfortunately, the L network rather lets us down in this respect — it would appear to be basically a low Q device. It wouldn't really win any prizes as a harmonic filter. It doesn't offer us much choice in terms of operating bandwidth. Perhaps it can be forgiven this one limitation!

For the low resistance output case:

$$Q = \sqrt{\frac{(50 - R_{LOAD})}{R_{LOAD}}}$$

and for the high resistance output version:

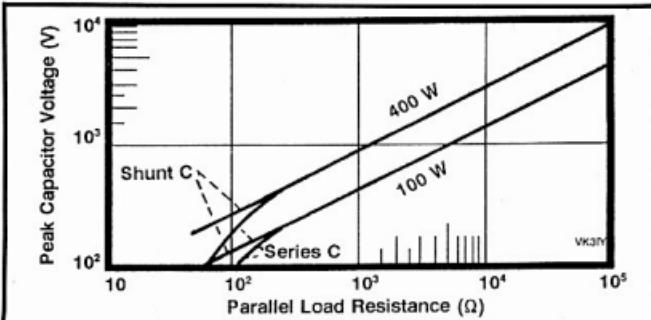
$$Q = \sqrt{\frac{(R_{LOAD} - 50)}{50}}$$

Both functions are illustrated in Figure 13.

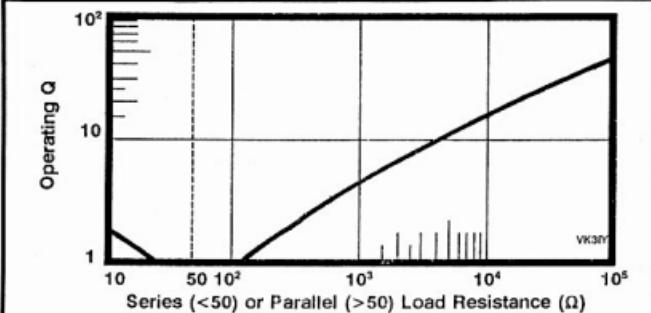
### Insertion Loss

There is a price to pay for everything and some energy is wasted within the network itself. This treatment assumes that the loss is confined to the inductor. We can draw some consolation from the fact that low operating Q implies low losses.

In general, the insertion loss depends both on the unloaded Q of the inductor and on the operating Q. The greater the former quantity, the



**Fig 12 — Capacitor voltage — high resistance output. Note that there is little practical difference between the series and shunt options.**



**Fig 13 — Network operating Q.**

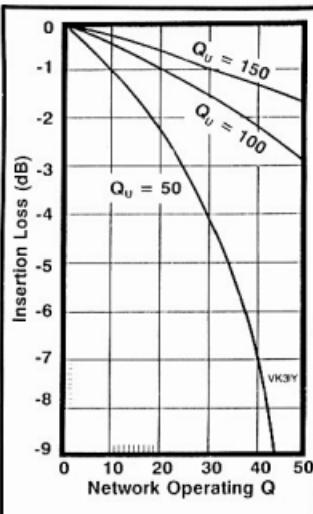
lower the loss will be. The converse applies to the latter. If no means of measuring Q is to hand, we need to indulge in some "guesstimation". If the inductor is of considerable diameter, not too long in proportion and substantially air-spaced, we can take a stab at a Q of 150. If it's wound on a somewhat lossy former, we can claim a Q of about 50. For cases in between, let's say 100 (these perhaps err on the conservative side).

The efficiency of the circuit may be expressed as:

$$\eta = \frac{Q_{UNLOADED} - Q_{LOADED}}{Q_{UNLOADED}}$$

and insertion loss =  $10 \log_{10} \eta$  dB

Figure 14 shows a plot of insertion loss for the three values of  $Q_u$ . This shows that for most practical situations the loss, being less than 1 dB, is insignificant. It also means that we don't have to be too fussy about the design of our inductor, with respect to efficiency.



**Fig 14 — Insertion loss for three values of unloaded Q.**

## Roundup

The L-match has been shown to cover a wide range of load impedances with high efficiency. It has one of the greatest virtues possible in any equipment — simplicity. Lack of harmonic rejection is its one deficiency.

From the point of view of hand capacitance, a shunt capacitor arrangement is easiest; however, if split stator devices are used, the benefit of an earthed rotor is not obtained. This treatment has only considered unbalanced loads. It is possible, of course, to pre-face the system with a toroid balun to handle balanced loads, floating everything following above earth, but there is some danger of introducing inadvertent unbalance with this approach, unless the current distribution is defined by the antenna itself.

The inductor used may be adjusted by shorting a section of the solenoid with a jumper lead, or by providing a switched arrangement. An inductance of 20  $\mu\text{H}$  can readily be achieved by a single layer solenoid. Wheeler's formula is convenient to calculate coil inductance:

$$L_0 = \frac{r^2 n^2}{9r + 10l} \mu\text{H}$$

## WIA News

### US Ham Radio Bill is now Law

We learn from the Internet that the American Radio Relay League (ARRL) has succeeded in persuading the United States Congress to pass a joint resolution "...acknowledging that radio amateurs provide valuable help during all kinds of emergencies".

What is known as The Ham Radio Bill is now US Public Law 103-408. It was signed by President Clinton last October. The ARRL's success comes after several years' effort.

The law expresses the "sense of Congress" that all government agencies should encourage the use of new technologies in the Amateur Service and recommends that authorities throughout the United States should make

where  $r$  is the radius of the coil,  $n$  the number of turns and  $l$  its length. All dimensions are in inches.

A note of caution about inductors is appropriate here. Standard formulas, including the one given above, do not take distributed capacitance into account. At HF, this results in a higher effective inductance than calculated — the error escalating as the coil approaches self-resonance. At frequencies above self-resonance, the coil is not an inductor at all, but behaves as a lossy capacitor. An L-match in this situation will, of course, simply not work. The obvious cure is to use less turns than calculated.

More complex ATUs, if they can be reduced to equivalent L networks, may be handled by the procedure given above. The treatment given assumes knowledge of the load impedance. Perhaps a thumb-nail sketch of the values to be expected would be in order.

For antennas shorter than a quarter-wave, the resistive component varies from about 5  $\Omega$  to 36  $\Omega$  at resonance. Its reactance may be as high as 1000  $\Omega$  capacitive (the thinner the greater reactance), diminishing to zero as resonance is

approached. A counterpoise, if mostly horizontal and not too high, would have the same reactance but zero resistance. Simply add its reactance (algebraically) to that of the antenna. Longer antennas have an inductive reactance increasing from a few hundred ohms to some 2000 or so for a thin antenna, and perhaps 500  $\Omega$  or so for a thick one. Resistance over this range may vary from about 40  $\Omega$  just above resonance to some thousands at half wave resonance.

If you would like the derivation of any formula quoted above, whether from mere curiosity or from healthy scepticism, an SASE will fetch it for you.

For further reading, and another view point, refer to the work of Lloyd Butler VK5BR — Loading Up on 1.8 MHz, *Amateur Radio*, December 1985, pages 11-14, and An Approach to Antenna Tuning, *Amateur Radio*, June 1987, pp 12-16.

You have been led, gently I hope, through all that is necessary for the design of an L network. If a little light has been shone into some dark corners along the way, that can only be a good thing. May you enjoy an SWR of one to one for ever and ever. Amen.

\*7 Britannia Creek Road, Westburn VIC 3799

"reasonable accommodations" for amateur radio operation from private homes, from vehicles and in public places, says the report.

The new law does not require specific action by any government agency or personnel, but the ARRL says it can help in negotiations with any authority at any level of government that might be acting, or planning to act, in any ways that might hinder amateurs' activities.

### New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of March 1995.

|        |                |
|--------|----------------|
| L20993 | MR J L ROY     |
| L20994 | MR E DECELIS   |
| L20995 | MR B WERBOWSKY |
| L20996 | MR K BIRKETT   |
| L30909 | MR P MASKREY   |

|        |                     |
|--------|---------------------|
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| N4YKD  | MR D L BURNS        |
| VK2ATL | MR L G PERRETT      |
| VK2DAM | MR A J JACKSON      |
| VK2GPJ | MR P K JORDAN       |
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| VK2IAY | MR S LAWMAN         |
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| VK2ICW | MR J CARTER         |
| VK2KJD | MR J G PITCHER      |
| VK2MMA | MR M J MORAS        |
| VK2MJV | MR D V MARKS        |
| VK2SKI | MR W PAULINSKI      |
| VK2VAN | MR J J VAN DENDEREN |
| VK2XVJ | MR F J WEBER        |
| VK2YGA | MR G J ALLEN        |
| VK2ZDW | MR W B WEILEN       |
| VK3NBH | MR B C HAYNISH      |
| VK5NL  | MR N W LANGMAN      |
| VK5ZCV | MR P J SKINN        |
| VK5ZKA | MR R M HOWDEN       |
| VK6GE  | MR F M MADDISON     |
| VK6NGD | MR G J DOWN         |
| VK6NMK | MR F M KELLY        |
| VK8MS  | MR M G SELLERS      |

## ■ Operating

# Morse Not Required

Bob Hawksley VK2GRY\* argues that the insistence on Morse code as a licence requirement is self-defeating and urges that it be dropped. In so doing he reviews some of the correspondence that has appeared in Amateur Radio on the matter.

In August 1992, *Amateur Radio* published a letter of mine in which I argued that Morse was no longer necessary. In the October edition of the same year Peter Wellum VK5ZPG endorsed my view and I still adhere to it.

What apparently escapes the powers that be is that once Morse is removed as a requirement there will inevitably spring up a class of ham who either delights in using it or is eager to learn it since its use enables DX operating on a grand and wonderfully economical scale. In short, Morse would become fashionable and CW Clubs would proliferate. Such clubs would aim to teach Morse, develop accreditation as Morse examiners, encourage and develop new ways of utilising Morse and generally contribute to the fun of ham radio. At the same time, of course, members of such clubs would delight in their own exclusiveness. And why not? Such is human nature.

Looking back over past issues of *Amateur Radio* Graham Jackson VK3TFN said in July 1990, "Not everyone enjoys CW — many find it extremely difficult to master, due to lack of aptitude, not lack of intelligence, or diligence". Hear, hear. Pounding Brass said in October 1990 that "... polls taken in Australia favour retention of Morse code and that it be an examination necessity." Was that proof of anything in particular?

In December 1990, Ian Hunt VK5QX said "We should come back to basics. There is a valid reason for the Morse requirement independent of other arguments. Emergency situations occur and it is possible, and likely, that a radio call for help will be transmitted using Morse." That didn't go down too well with Graham

Jackson VK3TFN who, in January 1991, thought that Ian Hunt's comment was "...a great argument for compulsory requirement in CW, and Japanese and Esquimaux and any other language one might receive a distress signal in." Graham wasn't allowed to get away with that because, in February 1991, Peter Alexander VK2PA said that Graham didn't realise that Morse is a common language. Um! Common to a certain extent, Peter, and perhaps OK for SOS and co-ordinates but not much cop for nattering about the meaning of life.

Also in February 1991, G W Lanyon VK2AGL touched on my favourite point by saying that passing the test doesn't make you a CW operator. "You only become one of the elite after years of practice." I agree. I never was one of the elite and, as the years go on, I'm more of the delete.

In my opinion a speed of 10 wpm is quite inadequate for serious operating. To be really serious about Morse the pass speed should be, wait for it, at least 25 wpm together with a good fist and a competency with procedure. And to get up to 25 wpm it is necessary to pass through the threshold of 14 wpm at which point the brain goes into auto and a person automatically writes what is heard without being conscious of the decoding process. Being in brain auto is the real secret of Morse operation.

In the same issue, Ted Gabriel VK4YG also took Graham Jackson to task by saying that 60% of the contacts worldwide were conducted in Morse code. He gave the reasons.  
(a) Language difficulties where speech is concerned.  
(b) High cost of equipment in less affluent countries has led to simple solid-state CW rigs.

- (c) Often proven fact of the superior performance of CW under poor conditions.
  - (d) Ability to copy distress calls in Morse should be essential for all radio operators.
- Ted's (d) sounds ideal but way beyond the scope of thousands unless examinations are made so tight and that there are regular exercises in depth to test competence which begs the question — is ham radio a hobby or preparation for membership of a resistance group?

In May 1991 T D Dowling VK4OD pointed out that you can beat QRM on CW and not on SSB. Dead true. But he followed that by saying "...isn't it strange that nearly all criticism of CW appears to come from persons who do not — or won't try to — use this [CW] mode." Are you sure? Doesn't strike me as strange at all. Common sense. Let's face it, Morse is a primitive method of communication and labour intensive, but technically it's cheap and it's fun. That is all.

So to June 1991, and Graham

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Jackson came out to do fresh battle and said lots of sensible things like the days when CW was essential are gone, ie essential, not in terms of qualifications, but in terms of the alternatives available now to CW illiterates. And in the same issue S V Ellis VK2DDL said "Competence in Morse is no measure of an amateur's overall ability. At the present state of the art, continued insistence on this licence condition can only be regarded as both regressive and retrogressive, and therefore a deterrent to the populating and preservation of our bands." Well said, S V Ellis. I entirely agree with you.

In July 1991 Kevin L Feltham poured much wisdom into the CW debate by observing that there were those in the boating world "...who maintained that it is not possible to understand fully seamanship unless you can handle a boat under sail in any conditions." Kevin contrasted that bold statement with similar statements that "...you can only be a competent radio operator if you can use Morse code under adverse conditions." Quite right, Kevin, which makes the 25 wpm operator a *sine qua non* does it not?

Kevin puts his finger on the rigidity of the arguments of the pro-CW lobby. Many people, including professionals, enjoy sailing and ham radio as recreations and yet the former aren't part of a private navy and the latter aren't members of a clandestine resistance group. So the upshot is that, as hams, we don't need to be all-singing, all-dancing.

In the same issue Drew Diamond VK3XU pleaded that, while Morse should not be a mandatory requirement, those with a proven interest in the code should be allowed unmolested access to the traditional "bottom end" of the HF allocations. And still in July 1991, Robert R McGregor VK3XZ argued that "Serious HF communicators should not miss acquiring a modest proficiency in this invaluable method [CW] and USING IT (Robert's capitals)." Robert's point cannot be denied but it carries with it the whiff of the lone ham in the midst of a disaster. Do we have to legislate for such probabilities? Ham radio is a hobby and WICEN exists and attracts



**Bob Hawksley VK2GRY enjoying a CW contact. Bob's shack shares the back of his garage with his dark room.**

to its ranks serious operators. And what of the thousands of CB radio users who all happily jam each other?

In August 1991, Geoff Marsh VK2GRM sang "Long Live CW" saying "Let's continue the CW, sort out the men from the boys, and see who is genuinely interested in the hobby, which means its future and, most of all, its colourful past." Sorry, Geoff, but that's nonsense and I can think of dozens of very clued-up hams who would take deep offence at such a comment. Nobody is saying do away with CW, only don't make it a mandatory requirement.

In September 1991, Thomas Knopp VK3MEY asked all those who complained about how hard it was to learn Morse code "...for goodness sake, stop complaining. Sit down on your rear end and start listening to the Morse, and you'll get there." Fair enough. Morse is for those who want it. But for those who don't want it, or have no aptitude for it, why try to force feed?

Then there was a gap until my letter in August 1992, asking "Is Morse necessary any more?" Admittedly with the above I've been selective but, I trust, not unfair to the many correspondents.

These days, when a person goes for a job the applicant is not handed a goose feather and asked to make a quill; demonstrations of more modern skills are required. But to insist on an applicant for a full licence to demonstrate a Morse capability is exactly the same as handing over a goose feather.

So what's the point on insisting on

a knowledge of something which he or she will promptly discard the moment they are licensed? I'd rather they were closely examined on the causes and cures of TVI. How many hams embrace CW when fully licensed? How many hams even remember their 10 wpm a year after getting their licence? (It can't be many because, unless one gets beyond 14 wpm, one will forever be floundering.)

But, amazingly, two thirds of all operators in the world use CW so it's in no danger of falling into disuse. It will continue to be used because of its utility and despite its primitiveness.

It's time to bring ourselves up-to-date and recognise that the technology that gave us birth has raced ahead in awesome ways. Of all developments the PC is the most exciting. Although still in its infancy, nobody is insisting that a PC user must be able to touch type before getting in front of a keyboard. So why insist on Morse before getting in front of a rig?

In my view no cogent argument remains for insisting on Morse. It has a place but it must be a place of free will. Rather like calligraphy. It's lovely if you can do it. If you can't you're missing out.

Many would-be hams are put off by the insistence on Morse because they see in it a very limited application for them. Thus insistence upon it has now become self-defeating. When I first acquired my licence in 1949, Morse was the gateway to the stars. Not any more!

"21 Wallumatta Road, Newport NSW 2106

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## ■ Equipment Review

# MFJ-249 HF/VHF SWR Analyser with LCD Frequency Counter.

# MFJ-259 HF/VHF SWR Analyser with LCD Frequency Counter.

Reviewed by Ron Fisher VK3OM

It seems that printing out the names of these devices might take up half the review, but stick with me, these little instruments are very worth while.

Let's go back to the January 1993 issue of *Amateur Radio*. It was there that I reviewed the MFJ-247 HF only SWR analyser and had a few misgivings about it. The latest two devices have coverage up to 170 MHz so are usable from 160 metres right through to 2 metres.

If you don't have access to the earlier edition of *Amateur Radio*, let me explain just what these analysers actually do. Each unit contains a variable frequency oscillator which tunes in six switched bands from 1.8 to 170 MHz. The frequency of the oscillator is read with the built-in counter and displayed to a ten digit accuracy on a very clear LCD.

The oscillator is fed through a very sensitive SWR bridge to the antenna connector which is connected to the antenna, the antenna feeder, an ATU or a combination of all three. The SWR is then read from the built-in SWR meter. With this you can check the entire antenna system without putting a signal on the air. Well, only about 0.01 watt of signal which should not annoy anyone.

The earlier MFJ-207 did not have continuous coverage, and had gaps around 5.5 MHz which could have

been a problem for commercial users. The new models have full coverage. Also, the earlier model used a direct drive for the oscillator tuning which made exact frequency setting rather difficult. The new model uses a six to one vernier drive for much improved action. My complaint that the DC power input was not marked for polarity has been put right on the latest model. Thanks MFJ, it's nice to know you are listening.

The analysers can also run from internal power with eight AA batteries but it is still necessary to remove eight screws to install or replace them. All of my tests were carried out using an external 12 volt DC supply.

Current drain from the internal batteries is rather high so it's better to use these when outside work at the antenna is needed and use a power supply when in the shack. One of the great things about these meters is that the counter can be used independently of the analyser. Switches on the top allow the counter to be used externally with input via a BNC connector. Another switch sequentially selects the gate time of the counter.

I noted that the counter in the review analyser was much more accurate than the one reviewed in January 1993. At 146 MHz it was better than  $\pm 50$  Hz. Again, the lock up problems noted in the earlier model were completely absent with these units. I also noted that the SWR readings were more consistent with those obtained using my usual station meter.

In addition to the SWR meter, the MFJ-259 also has a "resistance" meter which is calibrated from 0 to 500 ohms. This is most useful when checking antenna feed systems as a



The MFJ HF/VHF SWR Analysers.

resistance other than 50 ohms will require both matching and tuning to achieve 1:1 SWR.

The instruction books have been upgraded over the earlier models. There is information on using both the 249 and 259 to adjust simple antennas, including dipoles and verticals, testing and tuning stubs and transmission lines, which includes checking the velocity factor of a transmission line. However, there are still a few odd things that don't quite add up. For instance, there are two pages devoted to a parts list which includes a circuit designator and description but there is no circuit to refer these to.

## Conclusions

MFJ have improved their earlier models to a very marked degree. The instruction manuals are also better. All of my complaints about the MFJ-247 have been addressed and so these new models are highly recommended. The MFJ-249 is priced at \$499 and the MFJ-259 at \$549.

## QSP News

### Effect of RF Radiation on Eyes

We have received from its author, Hector Maclean VK3CEC, a copy of an article from "Developments in Ophthalmology" published by S Karger, Basel, Switzerland. Its full title is "Lens Heating in Donor Eyes by VHF and UHF Radiation".

Hector is an Associate Professor in the Department of Ophthalmology in the University of Melbourne, and also practises at the Victorian Eye and Ear Hospital. The summary introduction to his article is as follows:

"The increasing use of radio transmitters of the walkie-talkie and mobile phone types may pose a risk of cataract formation because the antenna is close to the eye. The resulting radiation may cause heat cataract. An experimental model has been developed to detect possible thermal effects on the lens from use of a moderate power transmitter at different frequencies and with antennas of different



The MFJ-249 with the MFJ-66 Dip Meter adaptor in place.

The two coupling coils and adaptor of the MFJ-66.

### MFJ-66 Dip Meter Adaptor

This handy little gadget can be used with either of the above analysers to effectively turn them into dip meters. Two coupling coils plus an adaptor are supplied in the kit. These are plugged into the "Antenna Connector" on top of the analysers.

Bring them close to the tuned circuit you wish to dip, tune the analyser past the frequency expected and note the dip on the SWR meter, read off the frequency from the counter and there you are. I did several comparison tests against my old Heathkit GDO, which is now over 35 years old, and found that the MFJ combination appeared to be rather insensitive. However, it is a useful addition to a pair of versatile instruments.

Thanks to Daycom Communications Pty Ltd for the loan of the review equipment. For further information please contact John Day of Daycom Communications on 03 543 6444.

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power gains. The two amateur radio bands where walkie-talkie use is most common were chosen. Mobile and cellular phones use a frequency just over twice that of the higher test band, and results from the other two bands may be extrapolated to this higher band."

The procedure which was used involved a plastic container simulating the radio-user's head, in which was mounted a donor eye (obtained from the Eye Bank). Temperature of the eye was measured directly using an alcohol thermometer readable to 0.1° C, and near the eye by a similarly accurate mercury thermometer.

A handheld type of transceiver (ICOM-32AT five watt dual band 2 m and 70 cm) was mounted relative to the eye in a position representative of normal use.

Transmissions were made for 10 minutes continuously on each band and using three different antennas, viz a short helical "rubber-ducky", and quarter wave and half wave whips for two

metres. Frequencies used were just below 148 MHz and just below 440 MHz. The quarter and half wave whips (on 2 m) resonated as 5λ/4 and 3λ/2 on 70 cm. Each measurement was repeated up to 10 times and results averaged. Tests were made first on the thermometers alone and then with the eye attached.

The results showed clearly that thermal effects alone were very small, the mean temperature rise being about 0.2° on the thermometers alone, and even less with the eye in position.

In discussing the results, the possibility of cataract formation by strong RF fields is not dismissed completely. It could be as a result of high peak power from a pulsed source, or due to high field strength affecting tissues. But the results do show, if heating by a CW source is to be a cause of cataract, that walkie-talkie power levels are unlikely to produce it.

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## ■ Technical

# Technical Abstracts

Gil Sones VK3AUI\*

### Simple Shortwave Receiver

Many years ago most amateurs were very well acquainted with regenerative receivers. They were simple and cheap and, in the uncrowded bands, they performed quite adequately. They were even used in some of the Second World War portable radio equipment used behind enemy lines. Even today they can provide reasonable performance and provide a lot of fun for a small outlay.

In the December 1994 issue of CQ magazine, Bill Orr W6SAI featured in his *Radio Fundamentals* column an interesting modern design for a regenerative receiver. The design is the work of Charles Kitchin of Analog Devices and was originally published in *Electronic Design News*. It is basically a single transistor regenerative stage followed by a two transistor audio amplifier.

The circuit is shown in Fig 1. Q1 is a regenerative RF amplifier with the level of regeneration controlled by R2. The signal is detected by D1 and the resultant audio is amplified by Q2 and Q3. The series string of D2, D3 & D4 is a simple voltage regulator for Q1.

The coil details given provide a tuning range of 5 to 10 MHz. Changing the number of turns will change the tuning range. A reduction drive on the tuning capacitor C2 would be desirable. C2 could be salvaged from a defunct radio. The value is not critical but it will determine the tuning range. Construction could use the ugly method with components soldered together above a piece of PCB laminate with tag strips or using glued-on pieces of PCB for interconnection points.

With such a receiver an RF amplifier is a useful addition, even if it is simply an untuned stage with minimal gain. When receiving CW or SSB the regenerative stage is

oscillating and can radiate a signal which may not be welcomed by your neighbours. The regenerative stage is most sensitive when on the brink of oscillation and adjusting the regeneration whilst tuning is an art.

An audio gain control can be provided by making R3 a potentiometer with C3 connected to the moving contact. However, the circuit can be operated without such refinement.

### Super Regenerative Receiver

The super regenerative receiver was once popular with VHF amateurs as it provided a fairly sensitive receiver with a minimum number of parts. They were usually accompanied by a modulated oscillator transmitter and they provided many amateurs with their first introduction to VHF. They still survive today in the many simple remote controls such as car locking and remote controlled garage doors and in many other domestic devices.

In Europe they are a serious source of QRM to 70 cm operators, but that is another story.

In the Fall 1994 issue of *Communications Quarterly*, a number of super regenerative receiver circuits were described in an interesting article by Charles Kitchin of Analog Devices, Wilmington, Massachusetts. These are of interest to amateurs as they provide simple receivers for VHF use which can receive AM or FM.

A simple single FET design for the FM broadcast band, which could be adapted to either the 52 MHz band or the 144 MHz band, is given in Fig 2. It would allow monitoring of an FM net or you could use it to listen to the local FM broadcast station. Another possibility is to listen to the aircraft transmissions in their band. However, for many of these uses, an RF amplifier is highly desirable both to aid sensitivity and, more importantly, to limit radiation. The super regenerative receiver is famed for the rough signal it can radiate.

The super regenerative detector gains its sensitivity by oscillating and so can radiate. The oscillation is actually at two frequencies, one of these being the frequency to which you are listening, and the other being in the region above the audio frequency range. The resultant rough rasping signal will be heard by your neighbours. You will only hear a

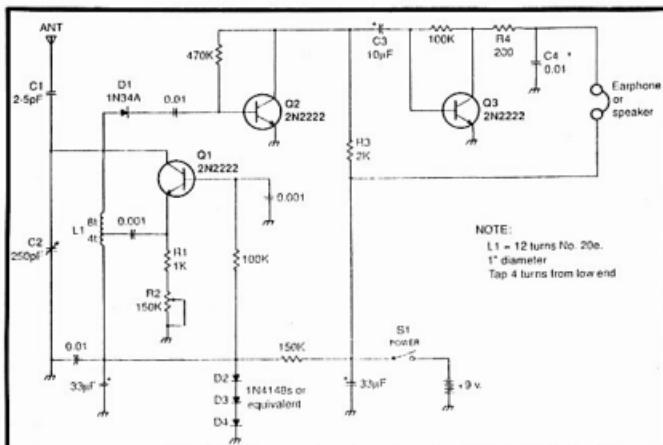
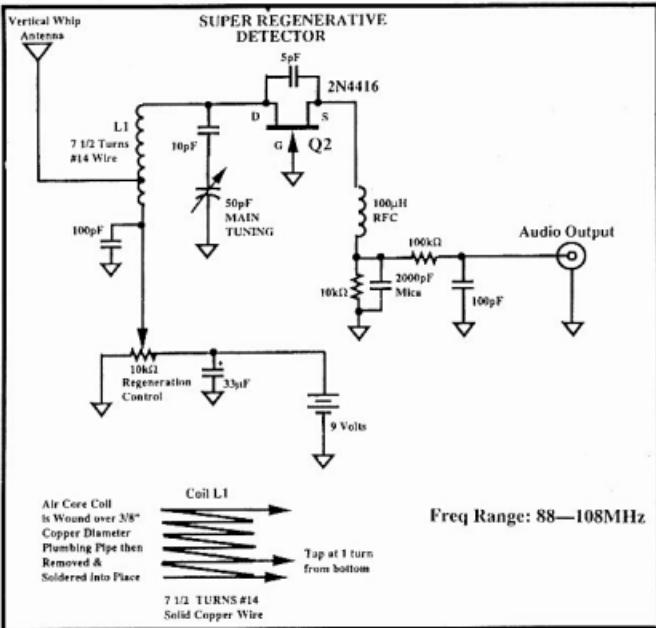


Fig 1 — Simple Regenerative Receiver.



**Fig 2 — Simple Super Regenerative FM Tuner.**

reassuring hiss indicating that the receiver is working. An RF amplifier will confine the signal and provide some amplification of the wanted signals. One of the Preamp kits from the VK5 component service would be ideal.

Sensitivity of a super regenerative receiver is derived from the detector moving in and out of oscillation at the signal frequency. A regenerative stage has highest gain at the brink of oscillation and by continually moving through this point the "super regen" gains its sensitivity. The stage is turned on and off by a super audio oscillation caused by it oscillating at a second or Quench frequency. This can be obtained from a separate oscillator but, in the circuit shown in Fig 1, the single FET oscillates at both the signal and the quench frequency.

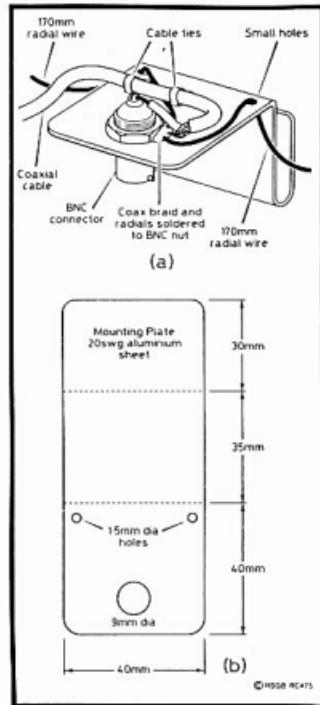
For more information on super regeneration the article in *Communications Quarterly* is recommended. This magazine is handled by Daycom Communications Pty Ltd who advertise in *Amateur Radio*.

### Window Clamp Antenna Mount

A window clamp antenna mount for a UHF antenna was described in *Novice Notebook* in the February 1995 issue of *Radio Communications* by Ian Keyser G3ROO. This was to provide a simple antenna mount for use with a UHF handheld. A gutter mount is hard if you have a car without a gutter and a magnetic mount can lead to marks on the paintwork.

The mount is shown in Fig 3. The radial wires are taped to the window glass to provide a ground plane. The handheld "rubber duck" antenna is used as the radiator. The same design would work on 144 MHz but the radials would have to be three times longer.

The mounting bracket is slipped over the top of the window and is clamped when the window is closed. The radials are taped to the glass using Scotch glazing tape which is used in the UK to join clear plastic roofing sheets. Similar tape may be available locally or you may have to find something experimentally.



**Fig 3 — UHF Window Clamp Antenna Mount.**

### Nicad Charger Integrated Circuit

In *Technical Abstracts* in the March 1995 issue of *Amateur Radio*, an interesting Nicad charger was featured. The only snag was the source of the IC used.

The maker of the IC was identified as Telefunken by Barney VK3XPW and also by Peter VK7KD who suggested a possible source. The U2400B IC had been used in a project in *Elektor* magazine and can be obtained by mail order from a Dutch firm who sell parts for *Elektor* projects. The firm is C-I Electronics, PO Box 22089, NL-6360 AB Nuth Holland and they have a FAX number of (+31) 45 241877.

The Australian Distributor of the Telefunken IC wrote including both Data and a catalogue. Telefunken are part of the TEMIC Semiconductor group which also includes Siliconix, Matra, Dialog and Eurosil and they

are represented by IRH Components who are the Australian Distributor. Even better, the letter included the news that Truscott Electronics of 32 Lacey Street, Croydon VIC 3136 can source the IC. Truscott Electronics phone numbers are 03 723 3860 and 03 723 3094 and the fax number is 03 725 9443.

The anticipated delivery is mid May and the price \$6-\$10 each plus freight. Sales tax was not mentioned but the pricing seems very reasonable. Contact at Truscott Electronics is Mr Ian Truscott. My thanks to Julian Rose, Victorian Branch Manager of IRH Components, for the letter and the information.

C/o PO Box 2175, Caulfield Junction VIC 3161

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## ALARA

Sally Grattidge VK4SHE\*, ALARA  
Publicity Officer

### Exciting Find

Some photographs of the Women's Emergency Signalling Corps taken during a group weekend at Newport in 1941. Mary Hay and Marie Dorkamp are on the left in the group in the top photo. The girls were trained by Florence McKenzie.

The photographs came from Jack McFarlane VK2NPX, whose XYL was Marie Dorkamp. Jack found the negatives in a box of "good junk" last year and, as far as we know, they had never been printed, which makes all of us who never throw anything out feel a whole lot better.

If you can identify any of "Mrs Mac's girls" in the photograph please contact Christine VK5CTY or Bron VK3DFY. They would also like to hear from you if you have any information about early YLs, especially interesting stories or photographs.

### Today's YLs — Three ALARA Profiles

#### Agnes PA3ADR

Agnes lives in the Netherlands where she is the first YL general vice president of VERON, the national society of radio amateurs in the Netherlands. She has been nominated for general president to take over on 22 April 1995, the year VERON celebrates its 50th anniversary. She is looking forward to a busy year with festivities throughout the country and speeches and forums to prepare.



In August last year her son married a girl from Australia. Though both had good jobs in the Netherlands, they emigrated to Australia in January 1995. Agnes hopes to visit them in their new country in December. She will be able to meet some of her ALARA friends while she is here. She would love her son and daughter-in-law to become radio amateurs, but understands that it is difficult to study when you are young and careers demand most of your time.

#### Pearl ZL2QY

Pearl lives in Otaki, is 85 years old and blind. She has been on the air for 20 years, recently acquiring a rig with voice synthesiser which she claims "talks to you and tunes itself". She was a skilled operator on less sophisticated rigs and has an amazing memory for names, numbers and bands, demanding respect from all of us who reach for the notebook every time we hear someone who has not been around for a while.

Pearl's OM Albert was licensed in 1934 when all Pearl heard from the shack was CW. When voices started coming out of the equipment Pearl began to take an interest, and gained her licence in 1974.

Amongst others, Pearl has an award for talking to women radio operators in 100 different countries, an award for talking to women operators in every state in America and an award for having so many awards. These days she spends most of

her time chatting to friends all over the world.

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Windsor 3181  
Victoria

Pearl was the first DX member of ALARA when she joined in 1976, sponsored by Mavis VK3KS. Mavis and OM Ivor VK3XB met Pearl and Bert (now SK) in 1975 while touring New Zealand.

Mavis provided the information about Pearl from an article by David Fisher in *The Chronicle* of 29 June 1994, sent to her by Pearl.

#### Joy VK4AT

Joy and her daughter Carol joined in when OM Bob started studying amateur radio. All three received call signs in November 1979.

Joy's first call was VK4VFJ (very friendly Joy), Bob's was VK4VIP (very important person) and Carol was VK4VIE (very important extra). Nine years later Joy passed her full call theory and became VK4JOY in March 1988. In December 1991, she finally cracked the code and became VK4AT.

Joy enjoys JOTA each year and for the past 14 years has joined Tom VK4TY under a sheet of canvas with a long wire and petrol generators at Karingal.

Joy is also involved in ATV, weather fax, all digital modes and packet, and is the proud owner of a 486 DX66 computer. Her latest venture is into Community Radio, and two mornings a week she is an announcer for 4BAY — 100.3 FM, where she interviewed Ian Campbell VK4TK about amateur radio on the program "Morning Magazine".

Details of Joy's profile came from the November 1994 issue of *The Bayside Beacon*, newsletter of the Bayside District Amateur Radio Society Inc.

#### Gosford Field Day

On 26 February, Dot VK2DCB and Margaret VK2MAS represented ALARA at the Gosford Field Day at the Wyong Racecourse. The first visitors to the table (and to sign the visitors' book) were Beryl VK2BBM and her OM Doug VK2YI.

Other ALARA members among the 37 people who signed the visitors' book were Marjorie VK2AMJ, Anne VK4ANN, Pauline VK2GTB and Pixie VK2PC.

Dot and Margaret had many interesting chats with YLs (and OMs too), sharing our stories about how and why we took up amateur radio. Pauline had a good reason. She was very keen to be a member of WICEN, but not just as the tea lady, so she got her licence.

Altogether a successful day and busier than expected. Margaret took her knitting to do in the "quiet times" and didn't do a stitch.

#### Silent Key

February 1995, Rae VE7CIX, who was sponsored by VK3BIR.

C/o PO Woodstock, QLD 4816

## AMSAT Australia

Bill Magnusson VK3JT\*

#### National co-ordinator

Graham Ratcliff VK5AGR  
Packet: VK5AGR@VK5WI

#### AMSAT Australia net:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7064 MHz (usually during summer).

Secondary 3.685 MHz (usually during winter).

Frequencies +/- 5 kHz for QRM.

#### AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia  
GPO Box 2141  
Adelaide SA 5001

## Two Amateur Radio Satellites Lost

AMSAT News Service recently released this report on the events leading to the loss of two amateur radio satellites during launch:

#### Explanation Of Tragic Loss Of TECHSAT AND UNAMSAT

ANS has received additional information regarding the loss of TECHSAT-1 and UNAMSAT-1. As reported earlier, the flight was on a converted ICBM. Lift off and following events apparently were nominal until the time came for the fifth stage to fire. All stages are reported as being solid-fuel rockets. After that time, it is said that signals were lost. It is not known whether any salvage will be attempted. It is speculated that everything burned up in re-entry as the flight was in the vicinity of 600 km altitude, although slow, at the time of failure. This was, apparently, the first time that a fifth stage has been attached in this flight configuration although the fifth stage module has been reported to have flown on other missions as an add-on stage. TECHSAT and UNAMSAT are said to have been accompanied, on the flight, by two Russian satellites. It had been reported previously that TECHSAT and UNAMSAT were to remain attached to a RESURS-

class spacecraft in orbit, but that was apparently for an earlier flight configuration which was changed some months ago. It is now reported that the payloads were all separately attached to the upper stage of the launch vehicle. AMSAT-NA President Bill Tynan (W3XO) expressed deep sorrow over this substantial loss to all of those who worked so hard to design and construct these spacecraft, and to the entire amateur satellite community worldwide. He said that he had dispatched E-Mail messages of condolences to the appropriate parties. [The ANS wishes to thank Richard Limbear (G3RWL) and AMSAT-UK for the material used in the preparation of this bulletin.]

A sad loss indeed for all those involved in the planning and construction of the two satellites. It's not the first time, of course. The original phase 3 satellite, which would have been AO-10, was lost in similar circumstances and there have been a couple of amateur satellites that have reached orbit but failed during commissioning or shortly after.

#### Home Brewers Corner

Bruce VK5KJ called to add his name to the list of satellite operator home brew enthusiasts. I'm still compiling the list and it's still open for expressions of interest. I'll publish what I have so far along with the regular frequencies and modes list in the July column.

## SunSat — New Satellite Planned

A satellite now being designed in South Africa will include an extensive amateur radio package and is scheduled for launch in January 1996. Called Sunsat, the satellite is being designed and built by engineering students at the Electronic Systems Laboratory at Stellenbosch University. In exchange for a US National Aeronautics and Space Administration launch, Sunsat will carry a precision GPS receiver and a set of Laser retro-reflectors, for NASA's use.

The amateur radio payload was approved at the SA-AMSAT Spacecon 91 Conference. It includes duplicate transmitters and receivers for the two metre and 70 cm bands, a 24 cm (1260 MHz) receiver and 13 cm (2400-MHz) receiver. A number of uplink and downlink frequency combinations are possible. Sunsat will offer extensive digital communication capability. One of the two metre receivers has four IF sections connected to 1200-baud AFSK packet

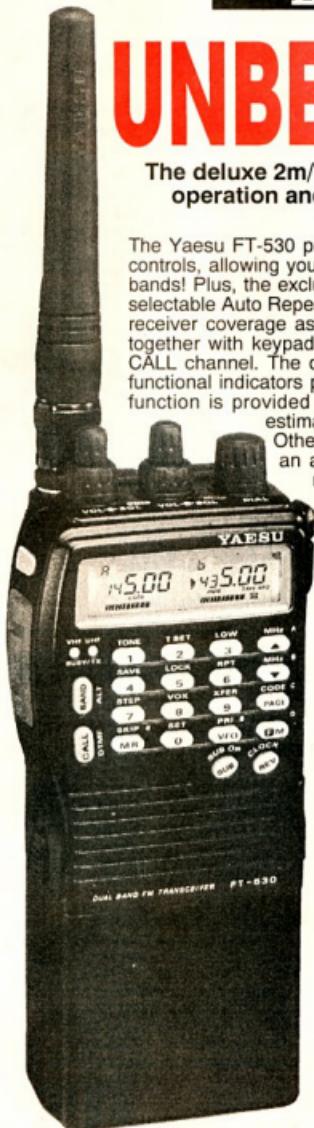


# UNBEATABLE VALUE!

The deluxe 2m/70cm dual-band hand-held Transceiver that offers easier operation and more features than ever before is still available at an unbelievably low price!

The Yaesu FT-530 provides a flexible dual receiver facility with separate volume and squelch controls, allowing you to listen on two frequencies in the same band or one frequency on both bands! Plus, the exclusive Australian version features full 70cm band coverage (420-450MHz), selectable Auto Repeater Shift on both 2m and 70cm (suits Australian band plan), and extended receiver coverage as standard. Two VFOs and 41 tunable memories per band are provided, together with keypad or dial frequency entry, seven selectable tuning steps and a one-touch CALL channel. The dual 5.5-digit LCD screen is back-lit for easy viewing and includes many functional indicators plus separate signal/P.O. bargraphs for both receivers. An LCD voltmeter function is provided so you can even monitor your battery's performance under load and estimate remaining battery life.

Other top features include: Inbuilt CTCSS encode/decode, CTCSS scanning, an auto battery saver (ABS) for extended battery charge life, a cross-band repeater facility and an inbuilt clock with alarm and snooze functions. Also provides VOX circuitry for use with the optional YH-2 headset, a user-replaceable Lithium back-up battery, and DTMF selective calling and paging. A DC supply jack allows simple transceiver powering and NiCad charging, with RF output in four selectable steps up to 5W at 12V. The FT-530 comes complete with an ultra high-capacity 1000mA/H NiCad battery, belt clip, carry case and approved AC charger. Cat D-3620



## Specifications

### Frequency range:

Transmit: 144-148MHz, 420-450MHz

Receive: 130-174MHz, 420-500MHz, 800-950MHz

### Current consumption:

Auto power off

Standby (saver on)

### Dimensions:

### Transmitter:

Power Output:

RF Power Output:

### Receiver:

Sensitivity:

Selectivity:

Audio Output (12V):

## 2 Year Warranty

5, 3, 1.5, 0.5 (at 12V)

2.0W (2m) 1.5W (70cm)

(Supplied 7.2V 1000mA/H NiCad)

55(W) x 163(H) x 35mm (D)

< 0.158uV, 70cm: < 0.18uV

(Ham bands only, 12dB SINAD)

>60dB

300mW at 8 ohms (at 12V)



YAESU

# \$699

Still Available At This  
Special Low Price!!

# Don't go mobile without a Yaesu Mobile Transceiver!

Whether you're going bush or operating around town, a quality mobile transceiver from Yaesu delivers the best performance.

## FT-2400H Rugged 2m Transceiver

The ultimate in dependability and reliability! The FT-2400H is built using commercial grade mechanical and electronic construction techniques and meets the tough USA MIL-STD-810C shock and vibration requirements, so you know you're getting the highest quality. A one-piece die-cast chassis/heatsink allows three-step output of up to 50 watts without forced air cooling. Plus, fibreglass circuit boards and chip components provide professional-grade reliability. It has a large backlit LCD screen, backlit knobs and 31 tunable memories (which can store frequency and a four-character name of your choice). A customised microprocessor also provides Auto Repeater Shift to suit Australian conditions. Two-stage track-tuning and a dual FET mixer improve receiver intermod performance. Scanning functions include programmable scan limits, selectable scan resume modes, memory skip, and priority monitoring. Seven selectable channel-steps and CTCSS encode are standard features. Comes complete with MH-26 hand mic., mobile mounting bracket and DC power lead.

Cat D-3630

**\$649**

**SAVE \$50**



**2 Year Warranty**

### Specifications

#### General

Frequency range: Transmit 144-148 MHz  
Receive 140-174MHz  
Channel steps: 5, 10, 12.5, 15, 20, 25 & 50kHz  
Current Consumption: Receive: 400mA  
Transmit: 12 Amp (Hi power)  
Dimensions: 160 x 50 x 180mm (w/o knobs)

#### Receiver

Intermediate Freq: 21.4MHz & 455kHz  
Image Rejection: Better than 70dB  
Maximum AF Output: 2.0 watts into 8 ohms @ 10% THD

#### Transmitter

RF Output power: 50/25/5 watts (Hi/Med/Low)

## Yaesu FT-840 HF Transceiver

Blending the high-performance digital frequency-synthesis techniques of the FT-890 with the operating convenience of the FT-747GX which it replaces, the all new FT-840 HF mobile transceiver sets the new standard for high performance in affordable transceivers. Covering all HF amateur bands from 160m-10m with 100w P.E.P output, and with continuous receiver coverage from 100kHz to 30MHz, the FT-840 provides SSB/CW/AM operation (FM optional), 100 memory channels, a large back-lit LCD screen, two independent VFOs per band, an effective noise blower and an uncluttered front panel, all in a compact case size of just 238 x 93 x 243mm (WHD). Unlike some competing models, small size doesn't mean small facilities. The FT-840 provides easily-accessible features such as: Variable mic. gain and RF power controls, SSB Speech processor for greater audio punch, and IF Shift plus CW Reverse to fight interference. Dual Direct Digital Synthesizers ensure clean transmitter output and fast Tx/Rx switching, while the low-noise receiver front-end uses an active double-balanced mixer and selectable attenuator for improved strong signal handling. The FT-840 weighs just 4.5kg and uses a thermally-switched cooling fan, surface-mount components and a metal case for cool, reliable operation. An extensive range of accessory lines are available, including the FC-10 external automatic antenna tuner, so you can customise the FT-840 to suit your operating requirements.

Cat D-3275

**2 Year Warranty**



**Still only \$1595**



modems. The satellite carries three G3RJUH-compatible 9600 baud modems that can be switched to various receivers and transmitters.

The designers say that ground-station requirements are minimal. Data communications between stations running 10 watt transmitters and dipole antennas will be practical. Since large quantities of data can be stored in the satellite, global data transfer will be possible. Sunsat carries a number of educational experiments including a two metre "parrot" mode repeater intended for amateurs new to satellite operating. Up linked speech will be digitally stored and re-transmitted on the same frequency enabling school users to hear the transmission and know they are getting through.

## FAQs (Frequently Asked Questions)

Suggested by Bruce VK5KJ, "How do

I get keplerian elements over the phone?"

There are several sources available, depending on where you live. Here in Melbourne our local packet BBS has a phone BBS attached and keps are available there for download. It will cost you a short international call but one of the best and most up-to-date sources is the Goddard Space Centre BBS. The number (including ISD code) is 0011 1 713 244 5625. This source is particularly useful during STS flights. On those occasions the very latest STS keps are right there on the introduction page so you only need to have disk capture on when you connect and you can disconnect after only a few seconds, reducing the cost substantially. If you know of any other reliable sources please let me know and I can compile a list for publication.

a little closer to the operational dates. In the meantime, further information may be obtained by contacting Jim White VK4BX, Secretary, Hervey Bay ARC, PO Box 829, Hervey Bay QLD 4655.

## Southern Cross DX Net

The co-ordinators of the "Southern Cross DX Net" have recently begun issuing a very handsome certificate to anybody who checks into the Net, provided that they apply for it. Apply to A Roocock VK4AAR, c/o PO Dalveen, QLD 4374 and include AU\$5.00 or US\$3.00 and a normal size self addressed envelope. Stations in NA, SA or EU should apply to Bob McCourt K14RU, 507 Highland Drive, Eustis FL 32726 USA.

## PLCA (Portuguese Language Countries Award)

This award is issued for confirmed contacts (or SWL reports) with ten countries where the Portuguese language is spoken. This list includes C9 Mozambique, CT Portugal, CT3 Madeira Is, CU Azores Is, D2 Angola, D4 Cape Verde Is, J5 Guinea-Bissau, PY Brazil, PY0F Fernando de Noronha, PY0S St Peter & Paul Rocks, PY0T Trinidad & M M Vaz Is, S9 Sao Tome & Principe, and XX9 Macao.

All contacts must be made from the same DX country. Contact must be made with land stations only. Maritime mobile and aeronautical mobile do not qualify. Participants must be licensed amateurs and SWLs. There are no time restrictions. There is an endorsement for contact with all 13 countries. A GCR list will be accepted.

The fee for the award is \$US4.00 or five IRCs (via airmail). The fee for the

## AWARDS

John Kelleher VK3DP — Federal Awards Manager\*

A survey carried out by one of my predecessors indicated that there were, in 1989, between 25 and 30 radio club stations actively operating Awards Nets. In 1994 I requested information from any and all club stations still actively engaged in the issue of awards, with the promise that free publicity would be given through the pages of *Amateur Radio* magazine, which has a world-wide circulation.

To my dismay, only four clubs responded. Does this mean that at least 24 radio clubs have become inactive or defunct, or have they just "shut up shop" for the duration of the present solar cycle?

Needless to say, I have kept my end of the bargain.

## VISOPeACE

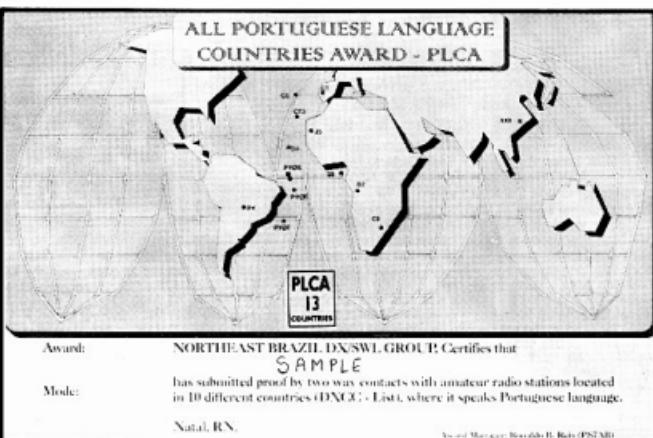
The Hervey Bay ARC has been allocated this "Very Special Call" for the period 1 August to 31 October 1995. This special event callsign has not been initiated to glorify war in any shape or form, but to attempt to bring together, in international unity, as many of our fellow amateurs as possible. The callsign is being activated in commemoration of the men, women, and children, of all nations, who lost their lives during the time of world conflict.

It will be realised that 1995 brings with it the 50th anniversary of the cessation of hostilities for World War 2 and, while the

world is in unrest in many localities, perhaps by our efforts the various leaders throughout the world may strive to achieve an everlasting peace.

The Hervey Bay ARC would be pleased to hear if your club, or country would be interested in activating a special call along these lines and thus gain a greater combined image.

Hervey Bay ARC intends to advise all amateur radio media regarding this event,



endorsement is \$US1.00 or one IRC. The award measures 310 mm X 215 mm and is in two colours. Applications should be sent to The Award Manager, North-East Brazil DX/SWL Group, c/o PS7AB, Ronaldo Bastos Reis, PO Box 2021, 59094-970 Natal RN Brazil.

### Life After DXCC

On the subject of life after DXCC, I intend to introduce (again) the US Counties Award. There are 3067 individual counties, so, to help those interested, I have already produced printouts of the entire list. A kind word and an SAE should be sufficient to get the list.

Another escape route is the DX Dynasty Award, which is a fun award with well over

the present total of 326 countries. It is being mentioned, along with other awards, in the hope that some use can be made of those piles of QSL cards. I would appreciate some input on this latter theme.

In conclusion, I would mostly appreciate some reaction from clubs running awards nets. You would be mildly surprised by the amount of mail I get requesting information on Australian Awards. I naturally have full information on WIA awards, but the pantry is very bare when it comes to State and domestic awards. If there is enough feedback, I will publish details received in booklet form, for the information of all concerned.

\*PO Box 2175 Caulfield Junction 3161

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### Interested in a dual band mobile?

Over the next couple of months savings of up to \$300 can be made on the

IC-2340H dual band mobile.

Call your dealer for details.

### Strength of the Australian dollar

The Australian dollar has weakened significantly against the Yen in recent

months. Unless there is a strong turnaround this can only mean price rises, making now a good time to buy!

### Savings on a HF Receiver

Significant savings can be made on the IC-R72A receiver. Check with your local dealer.

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## Club Corner

### Radio Amateur Old Timers Club

The 1995 Annual General Meeting and luncheon were held on Wednesday, 15 March. The existing committee was re-elected with John Fullagar VK3AVY as President and Arthur Evans VK3VQ as Secretary/Treasurer.

A most informative talk about the possible effects of non ionising radiation on the human system was given by Dr Ken Joyner, PhD, who is head of the Electromagnetic Compatibility Section of the Telecom Research Laboratories.

The most important message was that magnetic fields below 500 Hz were more likely to be troublesome than fields of similar strength at HF and VHF/UHF. Research has also shown that about 30% of energy from handheld devices is absorbed in the head of the user!

Bill Rice VK3ABP moved a vote of thanks to Ken after a long session of questions.

Publication of "OTN" was late due to computer problems and the incidence of "hamfests" requiring the presence of our Editor/Publisher, Stewart Day VK3ESD.

Allan Doble VK3AMD  
206 Poath Road  
Hughesdale VIC 3166

### CW Operators' QRP Club Inc

The 1995 QRP CW Weekend Contest, sponsored by the CW Operators' QRP Club Inc, will take place from 0000 UTC on Saturday, 17 June to 0800 UTC on Sunday, 18 June 1995. It will cover all VK, ZL and P29 call areas and use all normally recognised CW sections of the 80, 40, 20, 15 and 10 metre bands.

In order to spread interest and to reduce possible congestion, stations are asked to distribute their calling across

bands as follows: on the hour, all bands; hour + 15 minutes, 40 metres; hour + 30 minutes, 20 metres; hour + 45 minutes, 15/10 metres. Stations should preferably call on the recognised QRP Calling Frequencies (1.815, 3.530, 7.030, 14.060, 21.060 and 28.060 MHz), then OSY to a working frequency.

Contacts are to be logged with RST plus a three digit number commencing with 001 and incrementing by one digit for each contact. Repeat contacts will be allowed with a minimum of three hours between subsequent contacts.

Contacts with non-DX stations will score one point for a QRO station and five points for a QRP station. Contacts with DX stations will score ten points for a QRO station and 20 points for a QRP station. A DX station, for this contest, is any station outside VK, ZL and P29.

Certificates will be awarded to the first three placgetters overall and to the highest scorers in each of New Zealand, the Australian States and Papua/New Guinea.

Any station claiming to operate QRP must not exceed a maximum of five watts carrier power to the antenna and should sign with the /QRP suffix.

Logs showing contacts and points claimed should be sent to Ron Everingham VK4EV, 30 Hunter Street, Everton Park, QLD 4053 no later than 18 July 1995.

Ian Godsil VK3DID  
Awards and Contests Manager  
CW Operators' QRP Club Inc

### South East Radio Group Inc

The South East Radio Group Inc is holding its 31st annual convention — yes, that's right, its 31st Convention! — over

the weekend of 10 and 11 June 1995.

This year the program has greater emphasis on Fox Hunting type events. This is in line with our responsibility to conduct the Australian Fox Hunting Championships each year. However, increasing emphasis is to be placed on the Home Brew competition. So, come on all you Home Brewers, "rolling your own" can't be that hard. It doesn't have to be flash, just home built. There are three different sections ranging from Novice to Expert, so, if you built it, bring it. Great prizes too!!

The South East Radio Group convention promises to be a very popular spot on the amateur radio calendar so make sure you don't miss out by booking your accommodation early. A list of recommended motels and caravan parks is available by writing to the Convention Coordinator, SERG, PO Box 1103, Mt Gambier SA 5290.

Hope to see you there.

Simon Vickery VK5VST

### Summerland Amateur Radio Club

The 36th Annual General Meeting of our club resulted in the following being elected:

President, Ken VK2HE; Vice-President, John VK2GY; Secretary, Peter VK2TEK; Treasurer, Karlene VK2JAY; Publicity Officer, Graeme VK2GJ; Committee Members, Mike VK2TMT and Bert Suesswok.

The next event on our Calendar will be the Grand Summerland Computer EXPO, to be held in the Lismore (NSW) City Hall on Saturday, 27 May from 9.30 am.

There will be commercial displays of the latest in Computer Technology and Electronics, tables of pre-loved equipment, "Bring & Buy" stalls, amateur radio demonstrations and lucky door prizes throughout the day. Refreshments will be available.

Admission is only \$2 per person, or \$4 per family.

For more details contact Ric VK2EJV on 066-895136 or on packet via VK2RPL-2 668900.

Information on other club activities may be obtained from Ken VK2HE, Peter VK2TEK, or Graeme VK2GJ, or the club BBS, VK2VDN-1 via VK2RPL-2, 668900.

The club's postal address is PO Box 524, Lismore NSW 2480.

Graeme VK2GJ  
Publicity Officer

### Eastern and Mountain Districts Radio Club

#### Amateur Exam

Saturday, 13 May is the date of the next amateur examinations to be conducted by the EMDRC. All applications should be addressed to the Examination Officer and arrive no later than Tuesday, 2 May. For more information, please contact Jack VK3WWW at home on 03 873 2459.

### May General Meeting

Are you interested in exchanging QSL cards with foreign stations? If the answer is yes, how about attending the May meeting of the EMDRC, to be held in the Willis Room at the Maroondah Civic Centre, Nunawading. Our speaker for the evening will be Ken Matchett VK3TL. Ken is the custodian of the WIA QSL Historical Collection. If you would like to see some rare cards, and possibly learn a few tricks to working those rare stations, this meeting should not be missed. For more information, please contact Jack VK3WWW at home on 03 873 2459.

Christopher Platt  
ar

MADE IN AUSTRALIA

New HF LINEAR AMPLIFIER

# EMTRON

## DX-2

THE "POWERHOUSE"

HI POWER HF LINEAR AMPLIFIER

EMTRON DX-2

### Be on top of the pile!

- Specially developed by EMTRON for those HAMS who demand quality and performance at a competitive price.
- Revolutionary new monitoring and display unit for full control of the DX-2.
- This power house will handle all the rigours of contest, DXing and high duty cycle emissions.
- EMTRON DX-2 is built to well known Emtron standards for quality, reliability performance and price.
- DX-2 has all the same unique features of EMTRON DX-2 with any other amplifier.
- IN PRICE, QUALITY AND FEATURES THE EMTRON DX-2 HAS NO COMPETITION.
- Order EMTRON DX-2 (no middle man's markup), and become a "TOP GUN".
- ORDER NOW AND SAVE

### Specifications:

- FREQ. RANGE: All HF amateur bands 1.8-29.7 MHz.
- MODES: SSB, CW, AM, RTTY, SSTV.
- POWER OUTPUT: 1500 watts PEP, CW or continuous carrier.
- DYNAMIC RANGE: 100:1 to 60 watts.
- INPUT SWR: Better than 1.3 : 1.
- ALC: Negative going, rear panel adjustment.
- HARMONIC OUTPUT: 50dB below rated output.
- INTERMODULATION DISTORTION: 35dB or better between rated outputs.
- FAULT PROTECTION: IP, LG, temperature, other.
- COOLING: Full cabinet ducted-air, temperature controlled two speed blower motor, pressurised hot air extraction.
- TUBES: 2x4CX800A/GU74B ceramic triodes designed and built for military use.

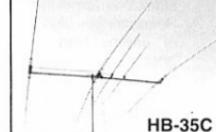
### TET-EMTRON ANTENNA SYSTEMS

SALE \$59  
Free Collins 1:1 balun worth \$59, comes now with every TET-EMTRON beam antenna!

#### THREE BAND BEAMS FOR 14-21-28 MHz BANDS

|                                      |       |
|--------------------------------------|-------|
| TE-13 rotatable dipole .....         | \$199 |
| TE-23 2-element beam.....            | \$414 |
| TE-23M 2-ele. mini-beam.....         | \$440 |
| TE-33 3-element beam.....            | \$575 |
| TE-43 4-element beam.....            | \$750 |
| HB-35C 5-element trapless beam ..... | \$770 |

DUE TO SHARP INCREASE IN WORLD ALUMINUM PRICES, WE WILL NOT BE ABLE TO HOLD OUR PRICES MUCH LONGER. BUY YOUR ANTENNA NOW, OR IT WILL BE TOO LATE!



HB-35C

#### FOUR BAND BEAMS FOR 7-14-21-28 MHz BANDS

|   |       |
|---|-------|
| TE-14 rotatable dipole.....                         | \$275 |
| TE-34 3-ele beam on 14-21-28MHz, 1-ele on 7MHz..... | \$695 |
| TE-44 4-ele beam on 14-21-28MHz, 1-ele on 7MHz..... | \$870 |

#### New EMTRON switching mode power supply

This is the power supply specially designed for your ham radio transceiver!

### EPS-20s

#### Specifications:

- Input: 240 VAC +/- 15%, 50 or 60 Hz
- Output: 110 VAC +/- 15% 50 or 60 Hz
- Regulation: +/- 0.25% at nominal mains
- Ripple: less than 25 mV peak at 15A
- Size: 60mm x 185mm x 300mm



# Contests

Peter Nesbit VK3APN — Federal Contest Coordinator\*

## Contest Calendar May — July 1995

|           |                                  |          |
|-----------|----------------------------------|----------|
| May 6/7   | ARI Contest CW/SSB/RTTY          | (Apr 95) |
| May 13/14 | CQ-M Contest                     | (Apr 95) |
| May 20/21 | Sangster Shield (80 m ZL)        | (Apr 95) |
| May 27/28 | CQ WPX CW Contest                | (Feb 95) |
| Jun 3/4   | RSGB Field Day CW                |          |
| Jun 10    | Merv Stinson Memorial (SSB)      |          |
| Jun 10/11 | ANARTS WW RTTY                   |          |
| Jun 17/18 | WIA Novice Contest               |          |
| Jun 17/18 | All Asia CW DX Contest           |          |
| Jun 24/25 | ARRL Field Day                   |          |
| Jul 1     | Memorial Contest (ZL)            |          |
| Jul 1     | Canada Day CW/Phone              |          |
| Jul 1/2   | Venezuela SSB DX                 |          |
| Jul 8/9   | IARU HF Championship             |          |
| Jul 15    | Jack Files Memorial (80 m Phone) |          |
| Jul 22    | Jack Files Memorial (80 m CW)    |          |
| Jul 22/23 | Venezuela CW DX                  |          |

This column receives a lot of information on disk, which certainly makes things easier for me. For those able to send information on disk, I can accept 3½" or 5¼" DOS disks in most

wordprocessor formats (I use WordPerfect). Just in case the wordprocessed version won't import properly, or the disk can't be read, please include an ASCII version plus a paper

printout as well. If possible, please use a fixed pitch font (ideally Courier 12 cpi), and spaces (not tabs) to position the text. Text formatting should be limited to bolding, underlining, and italics.

Speaking of disks, readers may recall my comments a few months ago about them getting scrambled in the mail. Whilst this undoubtedly happens on occasions, there is an additional danger lurking in the shacks of most amateurs. I speak of the innocent, but deadly (to disks), headphones! If your computer is anywhere near the operating position, take care NEVER to let your disks near your headphones, which will mess them up as quick as a wink!

I have been attacking the backlog of chores recently, and readers will notice more than the usual number of results this month. There are still a couple more sets of results to go, which will appear next month. Who knows, what with all this spare time (ie about 1/2 hour per week, or so it seems), I might even be able to finish the new antenna soon and (gasp) resume contesting!

Many thanks this month to VK2BOS, VK2SRM, VK4LW, G3PJT, G6LX, I2UY, ZL1AAS, CQ, QST, and Radio

## RECEIVERS

At Emtronics you source the largest range of Short wave Radios.



LOWE ELECTRONICS presents two brilliant new receivers, with the awards:

\*Most Portable Receiver  
\*Most Innovative Design  
\*Best DX Receiver  
HF-150, \$1050, HF-225, \$1550

Write for brochure!

### AOR: AR-3000A

The "TOP" of all communication receivers-scanners is the famous AR-3000A. This multi-mode radio covers freq. range from 100KHz to 2036 MHz.



### NEW AOR AR8000

A highly sensitive hand-held receiver boasting a very wide frequency coverage from 100KHz to 2036 MHz continuous. The all-mode reception provides AM, USB, LSB, CW, WSPR, SSB, 40m, 20m, 15m, independent 40 KHz SSB filter as standard, 50Hz resolution!

**MAGNETIC LONGWIRE BALUN ANTENNA** makes it possible to use a coaxial lead-in cable with all forms of longwire, without the need for antenna tuner. It is a simple, best and most effective SWL antenna. Complete antenna including balun \$159

## DIGITAL COMM.

**AEA DATA CONTROLLERS** represent the most exciting value in amateur radio today.

DS/P/MULTI MODE DATA CONTROLLERS The internal software provides all popular digital amateur data modes. Unique LCD read-out on the DSP-2232 displays mode/diagnostics for both channels. DSP-1232 SCALL DSP-2232 CALL

PK-900: THE STEPPING STONE BETWEEN 23MBX AND 232MBX. Developed from the 232MBX plus unique addition: dual simultaneous ports, software selectable modems, 9600 baud modem & PACTOR, etc. SCALL

PK-232MBX: MULTI-MODE DATA CONTROLLER. The PK-232MBX is a heating multi-mode controller combines all amateur data communication modes in one comprehensive unit. SCALL

PK-12: THE FIRST SSB PACKET CONTROLLER that delivers Full-sized performance. PK-12 is a 1200 baud VHF packet controller. Ideal for stations in packet "Gateway as Node" mode. Features include: \* AEA's HOST mode \* KISS \* Persistence \* Slottime! \$250

### New PK96 HIGH SPEED PACKET CONTROLLER/CALLBACK

Tired of waiting for packet data? Wish for an easy solution? Now there is one. The PK-96 is a low cost, high speed, single-mode controller

AEA SWR-121 PRO. ANTENNA ANALYZER

It shows a precise display of SWR curve independent of the feedline. With optional software you can save plots on your computer keyboard.

The SWR-121 is a highly desirable instrument in any RF workshop. It is also fully in any RF measurement system.

Available for HF & UHF band!

THE GREAT ANTENNA - ANT. ROTATOR PACKAGE DEAL \$100 OFF

Get your new KR-450xt antenna rotator and any of the following antennas: TE-33, TE-34, HB-35C, TE-34, TE-44 and

SAVE!

NEW CROSS-NEEDLE SWR/POWER METER

CN220: 1.8-220MHz, AVG.PEP.

CM150: 150W power range. ONLY \$195

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CM150: 1500W range. ONLY \$795

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KR5400 Dual Azimuth / Elevation

Rotator for Satellite tracking

Capable of Computer control

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Satellite Antenna Rotator

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Satellite tracker to control

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Antenna Rotator

SCALL

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SCALL

## The SG-230 Smartuner

Whether you are a HAM, LAND MOBILE, MARINE or AIR BAND operator., you need a efficient antenna coupler. The best on the market today is definitely the SG-230 made in USA by SGC, Inc. The SG-230 is a fully automatic antenna tuner, with locking feature, where a computer system continuously monitors all antenna parameters and instantly selects the right values from more than half a million combinations in its matching circuit to make sure everything is perfectly tuned. With 500 position non-volatile memory build in, and a memory management program, there is only one word for SG-230 HF AUTOMATIC ANTENNA COUPLER - RELIABILITY !

JRC JST-145/245 HF/HF+50MHz transceiver

Complete with BUILT-IN SWITCHING POWER SUPPLY, AUTOMATIC ANT TUNER, POWER MOSFET SEPs, SYSTEM and features see only a six page colour brochure can describe!

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Fax (02) 281 1508

Communications. Until next month, good contesting!

73, Peter VK3APN

## Help Wanted

Bob Whelan G3PJT is currently researching the history of the RSGB Commonwealth Contest (BERU). This contest, first held in 1931, was one of the first ever international contests. It has been held annually since inception, and represents a history of amateur radio contesting and HF DX operating. He would like to hear from anyone who entered, won, or who knows anyone who has records of the earlier contests, especially pre-1960s. Information on the pre-war contests would be especially valuable. Photographs, QSLs, personal recollections and emotions of the time would be very helpful. Readers can telephone Bob on 440 223 263137, fax him on 440 223 263940, or write to him at 36 Green End, Comberton, Cambridge CB3 7DY, UK. I would be happy to send more complete information on the sorts of things Bob is looking for, upon receipt of a SASE.

## Contest Details

The following contest details should be read in conjunction with the "General Rules & Definitions" published in April 1993 Amateur Radio.

## ARI International DX Contest CW/SSB/RTTY — Additional Rules

2000z Sat to 2000z Sun, May 6/7

Further to the rules published last month, recent information states that, to commemorate the 100th anniversary of the invention of radio by Guglielmo Marconi, for this year only several Marconi Memorial stations will be active from the places where Marconi performed his experiments. They will use the IY prefix, and will send RS(T) + "GM". Each of these stations counts as a separate multiplier.

Incidentally, if you work the same station on the same band more than once (using different modes), only the first QSO can be claimed for multiplier credit.

## Sangster Shield — Revised Date

Please note the correct date for this event of 20/21 May, not 13/14 May as mentioned last month. (Thanks ZL1AAS).

## RSGB Field Day

1500z Sat to 1500z Sun, June 3/4

This CW contest stimulates considerable portable activity in the UK

and Europe. Overseas stations can participate and submit a log, and certificates will be awarded to those in each continent who make the most contacts. Send logs to RSGB HF Contest Committee, PO Box 73, Lichfield, Staffs, WS13 6UJ, England.

## Merv Stinson Memorial Sprint (80 m SSB)

1030-1130z, Sat. June 10

The Redcliffe Radio Club of Queensland invites all amateurs and SWLs to enter the 3rd Merv Stinson Memorial Contest. This contest remembers the assistance Merv gave to many people to help them obtain their certificates of proficiency, and also the assistance he gave to the Club during contests, especially the John Moyle Field Day.

It is one of three sprints over a three month period, which aim to provide practice to those interested in contests, and who want to improve their operating skills. The object is for stations in VK, ZL and P2 to contact (or log QSOs if an SWL) as many stations as possible between 3535 and 3700 kHz within one hour, using SSB only. Contacts with any country are valid. Group operation is allowed, but only one callsign and station may be used.

Exchange signal report and serial number (leading zeros are optional, ie 591 can be used instead of 59001). The score is the number of stations worked (no multipliers). Logs must show date/time (UTC), callsign, and signal reports/serial numbers sent and received. Include a cover sheet showing name, address, callsign, total valid QSOs, a declaration that the rules and spirit of the contest were observed, and any comments. Send logs to Contest Manager, Redcliffe Radio Club, PO Box 20, Woody Point, QLD 4019, to be received by COB Monday, 26 June. Certificates to the highest score overall, in each VK call area, ZL, P2, and the rest of world.

## ANARTS WW DX RTTY

0000z Sat to 2400z Sun, June 10/11

This contest is organised by the Australian National Amateur Radio Teleprinter Society, and runs on the second full weekend of June each year. The object is to contact as many stations locally and overseas as possible on 80-10 m (no WARC bands), using any digital mode (RTTY, AMTOR, FEC, PKT, PACTOR, etc) (no satellite). Categories are single operator, multioperator (one Tx), and SWL. Max operating time is 30 hrs (single opr). Rest periods can be taken at any time during the contest. Mark rest periods in log. Messages comprise RST,

TIME (UTC), CQ ZONE. For each valid QSO, points are claimed according to zone. Space precludes publishing a complete points table. However, the following extracts show the points claimable by entrants in zones 28, 29, and 30. The numbers show the number of points for QSOs with zones 1 to 40, working left to right, top to bottom (ie the first number shows the points per QSO with zone 1, 2nd with zone 2, etc).

Your Zone = 28:

31 40 40 44 45 49 53 51 55 54  
49 48 46 32 30 26 22 20 20 25  
20 11 14 10 15 05 07 02 10 17  
31 24 34 25 36 30 22 26 19 34

Your Zone = 29:

39 50 43 52 54 47 49 54 52 44  
42 37 37 42 39 36 32 30 30 34  
28 21 24 20 23 16 15 10 02 09  
15 32 42 33 39 31 24 24 20 44

Your Zone = 30:

35 50 35 44 46 38 40 44 45 37  
41 33 34 49 47 42 38 35 32 43  
37 29 30 24 30 22 18 17 09 02  
24 07 51 42 47 40 33 32 29 48

Countries per ARRL DXCC list, except that each call area in mainland VK, VE, JA and W counts as a separate country. Mainland VK, VE, JA and W are not claimable. Call areas outside these mainland areas (eg VK0, JD1, KL7, KC4) count as separate countries. One's own country (as defined herein) can be worked for QSO points, but not for a multiplier.

Points are determined for each band and then added. Countries are similarly tallied. Continents are those worked on all bands (max 6). Total score is points countries x continents. Non-VKs should add a "VK Bonus" to their points tally, which is 500 pts for each VK worked on 80 m, 400 pts on 40 m, 100 pts on 20 m, 200 pts on 15 m, and 300 pts on 10 m. Send log and summary sheet to Contest Manager, ANARTS, PO Box 93, Toongabbie, NSW 2146 by 1 September. If required, a full page scoring table, and log and summary sheets, are available from ANARTS or myself upon receipt of a SASE.

## 1995 WIA VK Novice Contest

0800z Sat to 0800z Sun, June 17/18  
Presented by Ray Milliken VK2SRM,  
Novice Contest Manager

The object of this contest is to encourage amateur operation in Australia, New Zealand and Papua New Guinea, and particularly to promote contacts with Novice and radio club stations. Only stations in VK, ZL and P2 call areas are eligible to participate.

All operation must be confined to the

Novice frequency allocations in the 10, 15 and 80 m bands, viz 3.525-3.625 MHz, 21.125-21.200 MHz and 28.100-28.600 MHz. No cross-band operation is permitted. Stations in the same call area may contact each other for contest credit.

Sections include (a) Phone-Novice/Full call; (b) CW-Novice/Full call; (c) SWL. Except for club stations, no multi-operator operation is allowed.

Phone stations call "CQ Novice Contest", CW stations call "CQ N". Exchange a serial number comprising RS (or RST) followed by three figures commencing at 001 for the first contact and increasing by one for each subsequent contact.

Any station may be contacted twice per band, provided at least 12 hours has passed since the previous contact with that station. SWLs may log up to 10 sequential contacts made by a station, and then must log no less than another five stations before logging that station again. The five stations so logged need a minimum of one contact only logged.

Score five points for contacts with Novice or Combined call stations, 10 points for contacts with club stations, and 2 points for contacts with Full call stations. SWLs score five points for Novice to Novice contacts, two points for Novice to Full call or Full call to Full call contacts, and 10 points for contacts made by a radio club.

Logs must show Date/time UTC, Band, Mode, Station contacted, Report and serial number sent, Report and serial number received, Points. Each log sheet must be headed "VK Novice Contest 1995". The total claimed score for each page must be shown on the bottom of the page.

Logs must be accompanied by a summary sheet showing callsign, name, mailing address, section entered, number of contacts, and claimed score. The summary sheet must include the following declaration: "I hereby certify that this station was operated in accordance with the rules and spirit of the contest". The sheet must be signed and dated by the operator or, in the case of a club station, by a responsible officer of the committee, or a licensed operator delegated by the committee to do so.

Entrants may submit only one contest log per mode. Logs for entries where an entrant uses more than one callsign whilst operating in the contest will not be accepted. Send entries to Novice Contest Manager, Westsides ARC, Box 1, Teralba, NSW 2284, to arrive by Friday, 21 July 1995.

The Keith Howard VK2AKX Trophy will be awarded to the Novice entrant with the highest phone score, and the Clive Burns

Memorial Trophy to the Novice entrant with the highest CW score (these are perpetual trophies on permanent display at the WIA Federal Office). In each case, the annual winner will receive a suitably inscribed wall plaque as permanent recognition. Certificates will also be awarded to the top scoring Novice station in each call area, the top scoring station in each section, and to any other entrant where meritorious operation has been carried out. Awards are at the discretion of the contest manager. A Certificate of Participation will be awarded to all operators who submit a log in the contest.

### 35th All Asian DX Contest

CW: 0000z Sat to 2400z Sun, June 17/18  
Phone: 0000z Sat to 2400z Sun, Sept 2/3

The object is to contact as many stations in Asia as possible, on 160-10 m (no WARC bands). Classes are single operator, single and multiband, and multioperator multiband. Call "CQ AA" or "CQ Asia". Exchange RS(T) plus two figures denoting your age (YLS send "00"). For each QSO score three points on 160 m, two points on 80 m, and one point on other bands. The multiplier is the number of different Asian prefixes worked per band, according to CQ WPX rules (refer Feb 95). For example, JS9ABC/7 counts for prefix JS7. Note that JD1 stations on Ogasawara (Bonin & Volcano)

is belong to Asia, and JD1 stations on Minamitorii Shima (Marcus) is belong to Oceania. Final score is total QSO pts x total multiplier.

Use standard log and summary sheet format, clearly showing new multipliers when first worked. Send logs postmarked by 30 July (CW) and 30 Sept (SSB) to JARL, AA DX Contest, Box 377, Tokyo Central, Japan. Indicate phone or CW on envelope. Awards include certificates to the top one to five stations in each country on each band (depending on activity), and medals to the continental leaders. For full results please enclose an IRC and SAE with log.

Asian countries are: A4 A5 A6 A7 A9 AP BV BY CR9 EP HL/HM HS HZ/7Z JA-JS JD1 (Ogasawara) JT JY OD S2 TA U/R (CIS) VR2/VS6 VU VU4 VU7 XU XV3/W XW XZ YA YI YK ZC4/5B1 S1 4S 4X4Z 7O 8Q 9K 9M2 9N 9V.

### ARRL Field Day

1800z Sat to 2100z Sun, June 24/25

As with the RSGB Field Day (see above), overseas stations can participate and submit a log, but otherwise are ineligible to compete. Exchange RS(T) + QTH, W/VE will send operating class + ARRL/CRRL section. Send log postmarked by 26 July to ARRL Field Day Contest, 225 Main St, Newington, CT 06111, USA.

### Results of 1994 Merv Stinson Memorial Contest

Presented by Rick VK4LW

(\* = section winner)

#### SSB:

|         |                 |    |                       |
|---------|-----------------|----|-----------------------|
| VK1AJM* | John McInnes    | 11 | 1st VK1               |
| VK2MNA* | Darrell Edwards | 12 | 1st VK2               |
| VK2NPH  | Paul Hanna      | 7  |                       |
| VK3NFJ* | Paul Ellis      | 24 | 1st VK3 & 1st Novice  |
| VK3DD*  | Derek Thurgood  | 23 |                       |
| VK4OH*  | Gray Taylor     | 52 | 1st Outright          |
| VK4LW   | Ricky Chilcott  | 39 | 2nd Outright          |
| VK4IL   | Elizabeth White | 11 |                       |
| VK4FRZ  | Ritsie Zeeman   | 16 |                       |
| VK5UE*  | C. H. Low       | 19 | 1st VK5               |
| ZL1BVK* | Alex Learmond   | 29 | 1st ZL & 3rd Outright |

#### CW:

|        |                |    |                          |
|--------|----------------|----|--------------------------|
| VK3OZ  | Patricia Pavey | 8  | 1st VK3                  |
| VK4OW  | Ted Watson     | 12 | 1st Outright             |
| VK4TT  | K. E. Hanlon   | 10 | = 2nd Outright           |
| VK4EMM | John Loftus    | 9  |                          |
| VK5XE  | Ian Northeast  | 10 | 1st VK5 & = 2nd Outright |

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## Results of 1994 Jack Files Contest

Presented by Rick VK4LW

(call/pts/mult/total; \* = section winner)

### SSB, Single Operator, VK:

|         |     |    |      |                           |
|---------|-----|----|------|---------------------------|
| VK4AAR* | 155 | 35 | 5425 | 1st (Trophy)              |
| VK4NEF* | 66  | 23 | 518  | 2nd & 1st Novice (Trophy) |
| VK4OW*  | 50  | 17 | 850  | 3rd                       |
| VK5PMC  | 61  | 13 | 793  |                           |
| VK5UE   | 37  | 13 | 481  |                           |
| VK2MNA  | 27  | 9  | 243  |                           |
| VK1JE   | 18  | 12 | 216  |                           |
| VK4PJ   | 8   | 7  | 56   |                           |

### SSB, Single Operator, DX:

|         |    |    |      |        |
|---------|----|----|------|--------|
| ZL1BVK* | 78 | 30 | 2340 | 1st DX |
|---------|----|----|------|--------|

### SSB, Club:

|         |     |    |      |                   |
|---------|-----|----|------|-------------------|
| VK4BAR* | 184 | 32 | 5888 | 1st Club (Trophy) |
|---------|-----|----|------|-------------------|

### CW, Single Operator:

|         |    |    |     |     |
|---------|----|----|-----|-----|
| VK4AAR* | 48 | 15 | 720 | 1st |
| VK4OD*  | 13 | 9  | 117 | 2nd |
| VK5UE*  | 5  | 3  | 15  | 3rd |
| VK3APN  | 3  | 4  | 12  |     |

## RESULTS OF 1993 CQWW DX CONTEST

Note that single operator entrants must operate for a minimum of 12 hours to be eligible for an award. In the following results, an asterisk (\*) represents low power (150 W max), a hash (#) QRP (5 W max), and certificate winners are shown in bold. The results show call, band, final score, QSOs, zones, and countries.

### SSB:

In the all band low power category, P29KH came 10th worldwide. Zone leaders included VK8AV (zone 29) and VK5GN (zone 30).

### Single Operator:

|               |           |                  |             |           |            |
|---------------|-----------|------------------|-------------|-----------|------------|
| VK5GN         | A         | 1,948,926        | 1980        | 100       | 243        |
| VK3TZ         | "         | 1,308,888        | 1243        | 110       | 233        |
| VK8AV         | "         | 581,410          | 815         | 88        | 177        |
| VK4AAG        | "         | 278,216          | 631         | 60        | 106        |
| VK3EW         | 7         | 188,055          | 617         | 31        | 74         |
| <b>VK2VM</b>  | <b>A</b>  | <b>337,909</b>   | <b>648</b>  | <b>61</b> | <b>126</b> |
| VK3PU         | "         | 264,264          | 436         | 77        | 154        |
| VK2ARJ        | "         | 160,602          | 354         | 69        | 105        |
| <b>VK2AYD</b> | <b>21</b> | <b>334,696</b>   | <b>1081</b> | <b>30</b> | <b>77</b>  |
| VK4NEF        | "         | 39,772           | 233         | 21        | 40         |
| VK8BE         | "         | 3,819            | 69          | 9         | 12         |
| <b>VK3SM</b>  | <b>14</b> | <b>30,851</b>    | <b>116</b>  | <b>28</b> | <b>67</b>  |
| VK4GU         | "         | 3,078            | 32          | 16        | 22         |
| P29DK         | A         | 44,460           | 155         | 52        | 65         |
| <b>P29DX</b>  | <b>14</b> | <b>656,236</b>   | <b>1504</b> | <b>35</b> | <b>126</b> |
| <b>P29KH</b>  | <b>A</b>  | <b>1,853,280</b> | <b>2197</b> | <b>96</b> | <b>201</b> |

### Multioperator Single Transmitter:

|        |           |      |    |     |
|--------|-----------|------|----|-----|
| VK1DX  | 1,050,776 | 1709 | 82 | 141 |
| VK6ANC | 396,750   | 631  | 68 | 162 |

### Multioperator Multitransmitter:

|   |            |      |     |     |
|---|------------|------|-----|-----|
| VK9LI   | 10,881,894 | 7689 | 144 | 370 |
| (ops VK5KOO, K6MC, N6AA, N6CW, N6ZZ, W6KNC, W6XD, WB6OKK) |            |      |     |     |

### CW:

Congratulations to VK4XA for having the top score worldwide on 28 MHz low power. Even in the high power category, only two other stations worldwide had higher scores! Zone leaders included VK6HG (zone 29) and VK2AYD (zone 30).

### Single Operator:

|               |           |                |            |           |            |
|---------------|-----------|----------------|------------|-----------|------------|
| VK2AYD        | 21        | 652,795        | 1826       | 29        | 92         |
| <b>VK2BQQ</b> | <b>A</b>  | <b>450,264</b> | <b>613</b> | <b>98</b> | <b>159</b> |
| VK1FF         | "         | 359,464        | 660        | 64        | 132        |
| VK6HG         | "         | 282,240        | 406        | 85        | 155        |
| VK6LW         | "         | 49,920         | 217        | 37        | 43         |
| VK4XW         | "         | 33,900         | 134        | 43        | 77         |
| VK2QF         | "         | 30,004         | 200        | 23        | 30         |
| <b>VK4XA</b>  | <b>28</b> | <b>125,386</b> | <b>624</b> | <b>23</b> | <b>48</b>  |
| VK8BE         | "         | 1,425          | 25         | 8         | 11         |
| <b>VK4TT</b>  | <b>14</b> | <b>140,556</b> | <b>239</b> | <b>29</b> | <b>77</b>  |
| <b>VK3APN</b> | <b>7</b>  | <b>140,900</b> | <b>480</b> | <b>29</b> | <b>71</b>  |
| #VK2NV        | A         | 4,495          | 14         | 17        | 14         |
| <b>P29DK</b>  | <b>A</b>  | <b>507,698</b> | <b>902</b> | <b>76</b> | <b>118</b> |

### Single Operator Assisted:

|       |   |         |     |    |     |
|-------|---|---------|-----|----|-----|
| VK2VM | A | 450,448 | 831 | 75 | 113 |
|-------|---|---------|-----|----|-----|

Check log: VK9NJ

## Results of 1993 CQ WPX CW Contest

Congratulations to the continental leaders VK2BQQ (28 MHz, also 6th worldwide on that band), and VK4TT (14 MHz). The scores below show the callsign, band, score, QSOs, prefixes. An asterisk before the call indicates low power (150 W max):

|               |           |                |            |            |
|---------------|-----------|----------------|------------|------------|
| VK1FF         | A         | 171,655        | 272        | 172        |
| (opr WB2FFY)  |           |                |            |            |
| <b>VK5AGS</b> | <b>A</b>  | <b>73,788</b>  | <b>182</b> | <b>143</b> |
| <b>VK2BQQ</b> | <b>28</b> | <b>33,449</b>  | <b>111</b> | <b>83</b>  |
| <b>VK4XA</b>  | <b>21</b> | <b>178,724</b> | <b>286</b> | <b>182</b> |
| VK8BE         | 21        | 6,732          | 51         | 44         |
| <b>VK4TT</b>  | <b>14</b> | <b>134,136</b> | <b>247</b> | <b>184</b> |
| P29DK         | A         | 175,570        | 308        | 194        |
| P29JA         | 14        | 147            | 7          | 7          |
| *P20PL        | A         | 548,080        | 666        | 248        |

## Addendum to Results of 8th IARU World Championship (1993)

Due to an oversight on my part, the results for zone 55 were accidentally omitted from the results published last September. For the sake of completeness, the complete results for VK/P2 are published below (my apologies to the zone 55 entrants):

### Zone 55:

| Call  | Score   | QSOs | Mult | Sectn |
|-------|---------|------|------|-------|
| VK8BE | 570     | 19   | 6    | Phone |
| VK8AV | 185,170 | 412  | 97   | CW    |
| VK4TT | 14,256  | 124  | 24   | "     |

### Zone 59:

|        |         |     |     |       |
|--------|---------|-----|-----|-------|
| VK2VM  | 103,380 | 365 | 60  | Mixed |
| VK5GN  | 74,965  | 285 | 55  | Phone |
| VK2ARJ | 44,400  | 368 | 25  | "     |
| VK2DID | 10,740  | 87  | 30  | "     |
| VK2APK | 442,720 | 910 | 102 | CW    |
| VK2AYD | 238,293 | 603 | 83  | "     |

## Result of the 1994 CQ 160 m DX Contest

VK4YB was the only entrant from this region (shame on all you others, can't stand a bit of ORN)?! The results show the score, QSOs, W/VE states, and countries:

|        |     |    |   |   |
|--------|-----|----|---|---|
| VK4YB* | 936 | 17 | 4 | 4 |
|--------|-----|----|---|---|

## Results of 1994 ARI International DX Contest (CW)

(call/QSOs/mult/score; \* = certificate)

|         |     |     |        |
|---------|-----|-----|--------|
| VK2APK* | 386 | 124 | 185102 |
| VK4TT   | 44  | 24  | 5616   |

## Regional Results of 1994 ARRL RTTY Roundup

(call/score/QSOs/mult/hrs)

|       |        |     |    |    |
|-------|--------|-----|----|----|
| VK2RT | 8,364  | 164 | 51 | 24 |
| ZL3GQ | 12,800 | 200 | 64 | 24 |

\*PO Box 2175, Caulfield Junction, VIC 3175

# Divisional Notes

## Forward Bias — VK1 Division Notes

Peter Parker VK1PK

### Members Enjoy Talk on RTTY

Those present at the March Divisional meeting enjoyed a talk given by Alex VK1AC on radio-teletype operating. Alex pointed out that a VK1 on RTTY is keenly sought after by DX stations, and also that, while a VHF packet signal must be noise-free to be received, an RTTY signal containing some noise will still be copyable. All who attended received a free Jaycar catalogue from Tex VK1TX.

### Beacons Come Home

The VK1 2 m, 70 cm and 23 cm beacons have been operating from VK2 for some time. At the time of writing they are being moved back to VK1. Tune to 144.410, 432.410 and 1296.410 MHz to hear them. Incidentally, while it was situated in NSW, the two metre beacon was received as far away as Albany in Western Australia.

### Big Transmitters Up For Grabs

The VK1 Division has a small quantity of "Sailors" 500-600 watt, 0-30 MHz HF USB/AM/RTTY transmitters which include an F1 scanning receiver tuning ten fixed frequencies. Including a 240 V power supply and automatic ATU, the transmitters are fully synthesised with keyboard frequency entry. Mounted in 19 inch rack-mount cases, these transmitters come with full documentation. They will be sold in pairs, one working and one for spares. They are available to members only for a very attractive price. Contact the Division if interested.

### High Pass Rates in Recent Exams

It was announced at the March General Meeting that, of 24 exams recently administered, 15 were successful. This is a pass rate of 62 percent, and represents a significant improvement over previous exam sessions. The Division thanks Graham VK1GN for his efforts in this area.

### Broadcast Officer Wants Stories

In order to bring a comprehensive amateur radio news bulletin to you each week, Peter VK1NPW requires your input. If you have built a new antenna, gone portable, or tried a new mode, the

chances are that other people would like to hear about your experiences. Give Peter a call on 265 5830 (BH), 231 2766 (AH), or 018 541 402 (mobile) and see how easy it is to transform your words into an item which will capture the interest of your fellow amateurs.

### Miscellany

Who will be the first to work Sydney, Wollongong and the NSW South Coast from Canberra on 70 cm FM via the new linked repeater system now approaching completion? Will you be attending the VK1 Technical Symposium being organised by the Division? If you have any material for this column, please contact me on 285 1004 (AH).

### VK2 Notes

Richard Murnane VK2SKY

### Licence Fee REDUCTION

At the time of writing, it appears that the SMA has implemented the licence fee increase from \$37 to \$51. While it's better than the \$71 initially proposed, the VK2 Divisional Council feels we could do better.

As of early April, the "Fat Lady" was still looking around for her song book. The VK2 Division was approached by the Federal Government to produce a further submission, with a view to justifying a lower licence fee than we were paying before the recent increase.

To this end, we're asking amateurs *from all states of Australia* to send us key points of your submissions to the government. In addition, tell us specific examples of how amateur radio benefits your local community, eg local emergencies, community festivals, or clubs in your area that you have helped using amateur radio in recent years. And, of course, list those local WICEN events. We're aiming to raise the government's awareness of the true value of amateur radio, so they can set a more appropriate licence fee. The more examples we show them, the lower the fee we can justify. It's up to you!

As well as convincing the Government of our worth, we have to make it easy for them to justify lower amateur licence fees to the public, especially other spectrum users.

It seems as though the massive response from so many amateurs has left the government overwhelmed and perhaps a little confused, which is why they have approached us again, to make it simpler for them.

We have contacted the other WIA Divisions and overseas amateur organisations for their ideas for this submission and we want your input. Send your submission to the VK2 Divisional Office, PO Box 1066, Parramatta NSW 2124.

We're aiming for a "win-win" situation here. Lower fees for us and a greater awareness of the true value of amateur radio for the government and the SMA. Be in it!

### AGM and Council Election

Back to more mundane matters. The Division's court application to call a general meeting and Council elections will have been heard on 21 April. As you should be aware, legal problems resulting from irregularities in the conduct of last year's election and the "straw poll" necessitated this application.

As always, news of the latest developments can be heard on the Division's weekly broadcast. The text of the broadcast is also posted to the packet network. Speaking of the broadcast, we'd like to welcome our new audience from Victoria (HI).

### Free Publicity

Recently, my response to a letter in the *Sydney Morning Herald*, which had commented that Internet is "just ham radio for the computer generation", caught the attention of ABC Radio in Adelaide, who invited me for a ten minute interview on air about amateur radio. It just goes to show that, with a little imagination and a willingness to promote amateur radio, you can get free publicity in the most unexpected ways. To borrow a line from the film *The Commitments*, "say it loud — I'm an amateur and I'm proud!"

### VK2PFQ Is now VK2YC

Finally, congratulations to Divisional President Michael Corbin, who passed his AOC Theory and is now a "real" amateur (for those of you who believe in the amateur radio "caste" system!). Mike now sports the callsign VK2YC, which was the callsign of his father Jim Corbin, President of the VK2 Division in 1950-1 and 1953 to 1958.

*Thought for the month: When all you have is lemons, make lemonade!*

### VK6 Notes

John R Morgan VK6NT

### March General Meeting

At the March GM, our guest speaker was Yianni Attikiouzel, Professor of

Electrical and Electronic Engineering at the University of Western Australia. The subject of his talk was "Digital Signal Processing". In attempting to cover this technically difficult topic in the allotted 45 minutes, Yianni had volunteered for a "mission impossible", but his frequent comparisons with earlier (non-digital) methods helped the audience to gain some insight into the sub-systems and techniques involved.

The VK6 Division meets on the third Tuesday of each month, at the Westral Centre, East Perth, commencing at 8 pm. The bookshop and QSL bureau open at 7 pm. All interested persons (members and non-members, licensed or listener) are welcome to attend these meetings.

### WA Repeater Group

WARG invites you to take part in its VHF net, held every Sunday morning, commencing at 1030 am. Listen for VK6RRG on Perth repeater VK6RLM (146.750 MHz). Packet mail may be sent to [VK6RRG@VK6BBS](mailto:VK6RRG@VK6BBS).

### New VHF Site

An excellent site in the Welshpool industrial area has recently become available to us. The factory's main building boasts a 130 foot mast, for which the business has no use.

At the time of writing, it has not yet been decided whether the site will become the new home of the WIA-funded VK6RCW Morse Beacon (147.375 MHz), WARG's voice repeater VK6RPD (146.950 MHz), or some other device.

### Club Station VK6SEA

This callsign belongs to the VK6 members of the Australian Naval Amateur Radio Society (ANARS), which aims to bring together radio amateurs, and short-wave listeners, who have a professional naval or maritime background. The Society is affiliated to the Federal WIA, and has nearly two hundred members.

The members in VK6 plan to use the VK6SEA callsign at occasional special events, and on the Society's nets (7075 MHz LSB at 0330Z daily, and on 14.175 MHz USB at 0430Z daily, amongst others).

If you are interested in finding out more about the ANARS, contact Glenn Dunstan VK1XX, PO Box 2018, Kambah ACT 2902, or any of the local members: VK6APW, VK6BDB, VK6BPJ, VK6CF, VK6GW, VK6NT, VK6PDJ, VK6WO, VK2XH/6.

### WAADCA

The focus of the April meeting of the Western Australian Amateur Digital Communications Association Inc (known

as WAADCA, pronounced wad-kah) was a discussion concerning possible future projects. More details of these can be found in the Autumn newsletter.

The meeting also discussed the ongoing maintenance of the Association's numerous country digipeaters, since this work has been draining the enthusiasm (and the fuel-tanks) of the more active members. To combat this trend, it was decided that each of the clubs in the regions served by these digipeaters would be approached to take responsibility for the "care and feeding" of their local machine.

WAADCA meets at 8 pm on the first Wednesday of each month, in the Meeting Room of the Wireless Hill Telecommunications Museum, Ardross. Visitors are always welcome.

### Reminder

Just a reminder that all contributions to this column must arrive on or before the first day of the month preceding publication. Items from country members and clubs will be especially welcomed. Write to PO Box 169, Kalamunda WA 6076, or telephone (09) 291-8275.

### "QRM" — News from the Tasmanian Division

Robin L Harwood VK7RH

The Annual General Meeting of the Tasmanian Division was held on 25 March. The venue was the Domain Activity Centre, overlooking the picturesque Derwent River. The attendance was a little disappointing but those present indicated their continued involvement and interest in the affairs of the Institute. Andrew VK7GL welcomed those present and outlined the past year's activities in his presidential address.

This year saw two Council members stand down, Ted Beard VK7EB and Phil Harbeck VK7PU. Ted has been Divisional secretary and membership officer for five years. A vote of thanks was moved and passed and the Division is grateful for his assistance and involvement. He will be missed but is ready to assist the incoming officers to have a smooth transition. Thanks Ted! Phil has been on Council for a shorter time and filled the position of Treasurer. He has stood down due to work commitments. However, he will continue to be involved in the hobby, especially with WICEN, being deputy Northwestern co-ordinator. Thanks Phil!

After the various Divisional reports had been read, we moved on to the election of Council members. As the number of candidates exactly matched the number of positions, there was no need for an election. Elected were Andrew Dixon

VK7GL, John Rogers VK7JK, Bill Read VK7WR, Barry Hill VK7BE, Robin Harwood VK7RH, Terry Ives VK7ZTI, David Spicer VK7ZDJ and Tony Bedelph VK7AX.

Elected/endorsed to be Officers of the Division were Patron, Col Wright VK7LZ; QSL Bureau, Charles Payne VK7PP; Broadcast Officer, John Rogers VK7JK; Amateur Radio correspondent, Robin Harwood VK7RH; Hon Solicitor, Phil Corby VK7ZAS; FTAC Representative, Tony Bedelph VK7AX; Awards Manager, Clarrie Hilder VK7HC; WICEN Coordinator, Tony Bedelph VK7AX; Intruder Watch (IARUMS), to be announced (VK7RH acting); EMC Representative, A M Williams VK7AM; and Hon Auditor, Mr Justin Cook.

Following the AGM, the new Council had a brief meeting to elect the office bearers for the next 12 months. The new Executive is President, Andrew Dixon VK7GL; Vice-President, David Spicer VK7ZDJ; Secretary, Robin Harwood VK7RH; Treasurer, Terry Ives VK7ZTI; Assistant Secretary, John Rogers VK7JK; and Assistant Treasurer, David Spicer VK7ZDJ.

The next meeting of Council will be held towards the end of April. In accordance with one of the first decisions of the new Council, future meetings will be rotated around the various regions of Tasmania. At this stage, the inaugural Meeting will be on the Northwest coast, probably at Penguin.

Please note that the new Divisional Postal address is The Secretary, WIA Tasmanian Division, 52 Connaught Crescent, West Launceston TAS 7250, telephone (003) 31 9608.

Earlier in March, the Northern and Northwestern branches held a combined meeting in Deloraine. There were about 40 present, including two visitors from VE. A very successful evening was rounded off with an interesting talk by Don Hopper VK7NN who spoke about the International Maritime Mobile Net. Also, Bill VK7AK showed us some galena crystal rocks, found somewhere in Tasmania. Thanks to the Deloraine members for organising such an interesting evening and for the sumptuous supper that followed.

Meetings for the month of May will be the Southern Branch on Wednesday, 2 May at 2000 EAST at the Domain Activity Centre; the Northwestern Branch on Tuesday, 8 May at 1945 EAST at the Penguin High School; and the Northern Branch on Wednesday, 9 May at 1930 EAST at the Launceston TAFE, Alanon Campus, Block "C", Level Three, Room 17.

Next month it is hoped that I will be able to include a report on the WICEN involvement in Targa '95.

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# How's DX

Stephen Pall VK2PS\*

Early in March, the editor of *Amateur Radio* received a letter written by Doug VK2DDR protesting against the use of the name Conway Reef by past and present DXpeditioners.

A copy of that letter was sent to me by the editor to acknowledge in my column. Here is the full text of the letter for the benefit of all concerned.

"Dear Sir,

## **DXpedition to 3D2**

I read with interest, in the March edition of *Amateur Radio*, that there is to be another expedition to "Conway Reef". As there is no such place this should be a most remarkable feat!

The reef once known by this name has been called Ceva-I-Ra since 1976. Since then there have been a number of DXpeditions to the reef but so far as I am aware none have used the correct name which is no doubt the one for which the Fijian authorities issue the licence. As radio amateurs we have always been keen to demonstrate our capacity to keep abreast of the "state of the art". Perhaps an obsession with this has allowed us to slip behind in the most basic areas.

The DXpedition should show proper respect to Fiji by using the name that country bestows on its land.

I would be grateful if you would pass this letter to the US DXCC committee to ensure the matter is rectified. I will forward a copy to the Fijian authorities.

An acknowledgment in the *How's DX* pages of the next edition of *Amateur Radio* would be appreciated.

Regards,  
(signed) Doug Watkins, Balgowlah Heights."

Well, there you have it. I consulted my Macquarie Illustrated World Atlas and could find neither Ceva-I-Ra nor Conway Reef mentioned on any of its 512 pages. However, I had better luck with the Times Concise Atlas of the World. This shows Conway Reef on page 137 but does not show Ceva-I-Ra.

The ARRL DXCC Countries list shows 3D2, Conway Reef. Therefore, I do not believe that DXpeditions can be blamed for using the name of the country as shown in the official ARRL DXCC Countries list or as it is shown in geographical atlases.

But lets look into the future. Maybe we should also change the name of Scarborough Reef to Huang-Yan-Dao, and

the name of Pratas Island to Tung-Sha-Dao, not to mention the large variety of indigenous names of the Spratly Islands claimed by six different nations.

Name changes of countries for DXCC purposes can be initiated only by the ARRL DX Advisory Committee.

## **Ceva-I-Ra — 3D2CT & 3D2CU**

Ceva-I-Ra, as Doug pointed out above, is the official Fijian name of a small treacherous sandy coral atoll which is also known as Conway Reef. Five well known DXers, Mats SM7PKK, Garry NI6T, Nils SM6CAS, Jun JH1RHF, and Pekka OH1RY were to land on the reef on 24 March according to plan. However, "Mother Nature", who also played havoc with the previous DXpedition in May 1990, decided otherwise. The seas and the waves were very rough around the reef and inside the lagoon causing the expedition to run into significant difficulties attempting to land. One of the landing craft lost its outboard motor and, in the end, two boatloads of operators and equipment capsized in the heavy surf.

At one stage, only half of the group was on dry land with the other half still on the boat unable to do anything to help. A lot of personal luggage, clothing, passports and cameras were lost together with some radio equipment. All the operators survived without serious injury but the total material loss is about \$10,000.

The landing difficulties resulted in a delayed start for the expedition and only two stations were operational instead of the planned three. The two stations were put to hard work on a 24 hour operational

basis. One station, 3D2CU, served as a CW and RTTY station, while the other, 3D2CT, was used for SSB. They were operational on two different bands, sometimes in different modes, at the same time to reduce cross interference due to the closeness of the two stations on the reef.

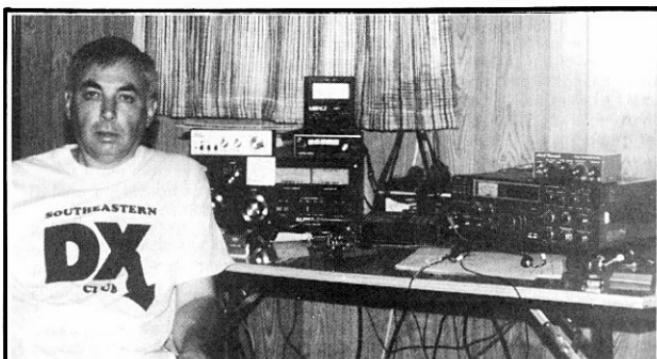
Signals were at a very good strength in Australia and many VKs worked them on all the bands used and in many modes. Traffic was heavy, especially to North America and Europe, and it took some skill and luck to "navigate" through the "dog-pile".

Following the news about the difficulties of landing, the Fijian Navy paid the DXpeditioners a visit on 28 March. I followed the DXpedition's activity on all bands when there was an opening to VK2. At one stage, at 1235 UTC, there were no takers following a CQ call on the 1.824 MHz CW frequency. Such is life! According to Gary NI6T and Mats SM7PKK, they still managed to total approximately 28,000 QSOs.

By the late hours of 2 April (UTC) and midday on 3 April local time, there was only one station left operating on 12 metres. As I write these lines they are preparing to leave the reef before sunset local time. Separate QSL routes for SSB and CW/RTTY were given in the April issue of *Amateur Radio*.

Despite the difficulties, the DXpedition did an excellent job and managed the dogpiles quite skilfully, thus giving many DXers their first contact with Conway Reef.

Due to increased costs and the considerable loss suffered by the DXpedition members, post-expedition financial help would be in order from the DX community. Send your contributions to The Conway Reef Fund, c/o Garry Shapiro NI6T, 20941 Nex Perce Trail, Los Gatos, CA 95030 USA.



Tom K4PI, active in Aruba as P49I.

**Vietnam — XV7SW**

Rolf Salme SM5MX has been operating from Hanoi, Vietnam from early November 1994. He is one of three legally licensed expatriate operators in the capital city.

XV7SW prefers CW and is active on the following spot frequencies for the time being, 14016, 14021, 21016, 21019, 28016, and 28019 kHz. Rolf uses a rotatable log periodic up about 30-35 metres and runs 500 watts to a Drake L4B on 20, 15 and 10 metres. He hopes to erect an 80 metre "sloper" soon. His spot frequencies on 80 and 40 metres, once he gets going, will be 3505 and 7033 kHz, although he wishes to negotiate a change for the 7 MHz frequency.

Rolf is also interested in 160 metres and is collecting information on suitable antennas. XV7SW is with the Swedish Embassy in Hanoi and expects to be there for another two years. He is the correspondent for Vietnam in IARU Region 3.

Many thanks for the above news to David Rankin 9V1RH/VK3QV, who is a Director of IARU Region 3 and is based in Singapore.

**Easter Island — XR0Y and XR0Z**

Cordell Expeditions (Dr Robert Schmieder, KK6EK of 3Y0PI fame), is organising a multipurpose, multi-disciplinary expedition to Easter and Salas y Gomez Islands from 2 to 23 September 1995. The activation of Salas y Gomez Island will produce a new IOTA reference number.

The expedition is looking for a VK or ZL operator to be part of the team. The expedition will include amateur radio activities (HF, VHF and digital mode operation), radio science including transequatorial propagation, beacons, propagation during low sunspot conditions, etc. It will also include natural science (marine specimens, bird surveys) and the study of the culture and history of Easter Islands. Radio amateurs, and also marine divers, are welcome. The cost is approximately US\$2000 plus airfare to Easter Island.

If you are interested, contact Bob by phone on \*1-510-934-3735, E-mail: Cordell @ CCNET.COM, or write to Dr Robert W Schmieder, 4295 Walnut Blvd, Walnut Creek, CA 94596 USA.

**Faure Island — VK6ISL**

The well known IOTA Island-hopper, Mal VK6LC, intends to activate this new island in the SW Coast-North Group, situated in Shark Bay, North Western Australia. The island is situated at Long

**PALESTINE****JAIUT/GAZA****JA3UB/GAZA****JK1KHT/GAZA****JO3XEQ/GAZA****PALESTINIAN AUTHORITY**

MINISTRY OF HEALTH

Gaza Strip

Planning and Specification Centre



Dec. 12-20, 1994

**ZONE 20**

السلطنة الفلسطينية  
وزارة الصحة  
قطاع غزة  
مركز التخطيط الهندسي والمواصلات

**The QSL card of the Japanese DXpedition in the Gaza Strip.**

113° 53' E and Lat 25° 51' S. Mal will be accompanied by his son Rhyon, a 4th year medical student who will help him set up the station and act as a general help. There is the possibility of another amateur assisting Mal at short notice.

Activity will be on the usual IOTA frequencies of 14260, 21260, 21190 (Australian Novice frequency 0100-0200 UTC only), 7084, 7220 and 3797 kHz. Send your QSL cards to VK6LC (VK & Oceania), 1H1YW (Europe) and K1IYD (North America). Mal's address is M K Johnson, 9 Abinger Road, Lynwood WA 6155.

**Future DX Activity**

- Nepal. 9N1RHM, 9N1AA and 9N1ARB can often be heard on Sundays at 1230 UTC on 14190 kHz when they talk with their friends in Western Australia.
- Cape Verde D44. There is a possibility that a group of British amateurs will be active from these islands during the first two weeks in June.
- Bhutan. Yasuo JH1AJT, one of the A51/JH1AJT group, hopes to return to Bhutan during the northern summer. He left all the equipment, antennas and amplifiers in Bhutan.
- Peter 9Q5TT left Zaire on 27 March. 9X5EE has left Rwanda and moves to Goma, Zaire for the next year and hopes to be active from there.
- 9N1MWU is active from Nepal until 10 May. QSL to JA8MWU.
- Galapagos. Horst DF1VU, Frank DL4VCG, Joachim DK5VP and Thomas DF8VK will be active under their callsigns/HC8 from Galapagos until 10 May.
- Rumour has it that the Russian bases on Franz Josef Land will be closed soon. R1FJL and RX10X/FJL are the present operators. This will be your last
- chance to work them if you need that country.
- Barry G4MFW/ZS1FJ has advised that he has now secured permission from the New Zealand Department of Conservation to land on, and transmit from, Raoul Island. The permission limits Barry's amateur radio activities to a few hours each day, and Barry is the only member of the scientific team who will be allowed to operate on 15, 20, 40 and 80 metres. His favourite spot on 20 metres will be 14260 kHz. Activity will be from 5 to 15 May.
- The special call 3A100GM will be aired on CW by the 3A CW group from 21 April until 21 May 1995 to celebrate the Marconi anniversary. QSL to 3A2LF.

**Interesting QSOs and QSL Information**

*E = East coast; W = West coast; M = the rest of Australia.*

- YK1AO — 7005 — CW — 1615 — Feb (M). QSL to Box 245, Damascus, Syria.
- 9X5EE — Alex — 1870 — CW — 1019 — Feb (M). QSL to PA3DLM T J M Mahoney Bockstaal, Josef Haydnstr 17, NL-4536, BT, Terneuzen, The Netherlands.
- TJ1AG — 14180 — SSB — 2136 — Jan (M). QSL to Thierry Lesnier F5RUQ, 31 Rue de Bleuets, F-22190, Plerin, France.
- 8R8ED — Helge — 14226 — SSB — 1309 — Feb (E). QSL to Helge Siljuberg LA1SEA, Box 117, N-2410, Hernes, Norway.
- XV7TH — Tornsten — 14195 — SSB — 1036 — Mar (E). QSL to SK7AX Soda Vetter Bygdens Amatorradio Club 2035, S-56102, Huskvarna, Sweden.
- CN2SM — Santiago — 14195 — SSB — 0806 — March (E). QSL to Antonio

Lopez Paradinas EA4EII, Cayetano Pando 4, 28047 Madrid, Spain.

- JW/DF6JC — 14189 — SSB — 1016 — Mar (E). QSL to German QSL Bureau.

- 4L7FS — Leo — 14300 — SSB — 0726 — Feb (E). QSL to PO Box 40-55, Tbilisi 380058, Georgia (note: postal service not secure).

- ZC4ESB — Mat — 14243 — SSB — 0644 — Mar (E). QSL to PO Box 96, Larnaka, Cyprus.

- YB2ARW — Jack — 14200 — SSB — 1347 — Mar (E). QSL to John R Sproat Jr W4LCL, PO Box 7009, Pasadena, CA 91109 USA.

- ZP6XR — Ray — 14192 SSB — 0443 — Mar (E). QSL to Renato Bellucci, PO Box 1937, Asuncion, Paraguay.

- TG9CB — Sam — 14164 — SSB — 0537 — Mar (E). QSL to Samuel L Saunders, PO Box 115, Guatemala City, Guatemala.

Okhotsk (57° 25' N and 139° 51' E) then Scott Island in Antarctica (67° 24' S, 179° 55' W) and last, but not least, the most important island, Bouvet Island (3Y) at the end of the trip in late October/November.

- Spratly Island. This operation took place from 29 March to 3 April from Layang Layang Island, the Malaysian claimed part of the archipelago. A group of Japanese and Malaysian amateurs were active on all bands and all modes with the callsign 9M0A. QSL via JA9AG. It was unfortunate that the timing of this expedition clashed with the one on Conway Reef. To compound the issue they used the same DX frequencies as the Conway Reef expedition. This not only caused confusion but also some "lack of patronage". The operators were heard asking, "where were the VKs?"

- Tunisia. 3V8BB has submitted proper documentations and QSL cards will be accepted now for DXCC credit.

- Since March all foreign amateurs visiting Kuwait must use their own callsign with the prefix designator 9K2/. As from 1 March, 9K2ZZ is now 9K2/N6BFM, 9K2ZC is now 9K2/K1OK and 9K2YY is now 9K2/N0YK1.

- Ken V73C (and AH9C) reports that he mailed all direct QSL cards from Kwajalein and, in addition, he sent out 248 Bureau cards. Ken states that the OKDXA (Oklahoma DX Association) is no longer his QSL Manager. Ken now has a new QSL Manager for all his contacts. He is Bruce Smith N4GAK.

- Three YLs were active from Spitzbergen Island in the Svalbard Archipelago (EU-26) for a few days in the middle of April. They were using synthesised portable radios with 25 watt output power to a dipole antenna. The operators were Unni JW6RHA, Turid JW9THA and Inger JW8KT. They were members of a glacier expedition, travelling by snowmobile and using battery power. QSL to their respective LA home calls.

- I heard a Lebanese station (OD5) calling "CQ" and an Israeli station (4X6) replied to the call. Deep silence. An Italian station told the Lebanese station that the Israeli had called him. A frightened Lebanese voice told the Italian, "I am sorry, I am not allowed to have contact with him". It is a sorry state of affairs when politics dominate amateur radio.

- If you hear VK3SKI/mm give him a call to cheer him up. Andy is on a 30 foot sloop named "Shahdaroba" and is sailing in the Caribbean. Andy left Melbourne about four years ago going westward through the Indian Ocean

and the Atlantic Ocean and is now on his way back to Australia. Expected arrival time is in 1997. He is using a TS440 with a dipole antenna on the backstay.

- I heard Bernhard DL2GAC when he was in New Caledonia saying that he will reply only to those who use their full call. The "two last letters" description is missing from Bernhard's dictionary.

- Jackie F2CW, the well known DXer employed by the International Red Cross to look after the victims of the present Balkan War, and who has his headquarters in Zagreb, Croatia, spent an enjoyable three weeks in New Zealand as a tourist on holidays. He was not on the air.

- Do you remember Al H44AP, who was active many years ago from the Solomon Islands? Al Pearce is now active from Papua New Guinea as P29EP.

- A VK5 amateur must have a very "deaf" receiver. He was quite happy to call "CQ" in the middle of a pile up on the listening frequency of Conway reef on 3504 kHz. He might have thought the pile-up was for him?

- If you have worked LX95VEC, a special event callsign to celebrate that Luxembourg has been declared the cultural city of Europe, the QSL goes to LX1NO.

- Jim TU4EI/TU5EY has returned to the USA. His QSL manager W3HCW notes that he "will continue to answer cards only until they run out. Only about 200 cards left..."

- Eddie VI0ANT has returned to his home base in VK4.

- There is an Arctic Polar net each Sunday on 14150 kHz at 0800 UTC with Victor UA1MU as controller.

- UA3YH/KC4 is operating from KC4AAA station in the Antarctic.

- When was the last time you heard the SMA (Spectrum Management Agency), or its predecessor the DoTC (Department of Transport and Communications) on the air? Never? On the contrary, they are on the air, but more often listening than transmitting. Therefore, it was with great interest that I heard VK7SMA at around 0730 UTC on 28 March announce that activities on the 80 metres DX window, 3794 — 3800 kHz, are being monitored and out of band transmissions, or transmissions with more than the approved legal limit, will cause a fine to be imposed, or prosecution launched, or both. The station provided a phone number (002) 681242 to explain the rules. You have been warned!

## From Here There and Everywhere

- Z32ZM, Mome advises, that the Macedonian QSL Bureau is not functioning, therefore QSLs should be sent direct with SAE and two IRC, or one "green stamp" to Dimovski Mome, Bedinje 109, Kumanovo, 91300, Republic of Macedonia.

I am happy to report that Percy VK4CPA, the founder and principal controller of the ANZA Net (21205/14164 kHz at 0500 UTC each day), is progressing well after many months in hospital. Percy lost part of one of his legs due to an operation, and is now in training to learn how to use his artificial leg. The ANZA Net (Australia, New Zealand and Africa) was Percy's idea and the net's first operational day was on 20 May 1970. On the 25th anniversary of the net we wish Percy a speedy and full recovery and future good health.

- A group of VK2 amateurs are contemplating forming a DX Group for exchanging DX information and to further the scope of DXing. Any VK or ZL interested in the project please contact John VK2DEJ on (02) 809 5686.

- QRZ DX, the Texas based DX Bulletin published by Bob Winn W5KNE and his wife Bonnie, has changed hands after 12 years. Many thanks to Bob for a job well done, and best wishes to Carl and Miriam Smith, N4AA and KB4C, the new owners of QRZ DX. The future address of the Bulletin is PO Box 16522, Asheville, NC 28816, USA.
- UA9OBA intends to visit and activate three islands starting June 1995. Firstly, Nanskian island in the Sea of

- Phil VS6CT is temporarily absent from Hong Kong. He has retired from his demanding job and is spending the early part of his retirement travelling to the UK and USA. He intends to return to Hong Kong later in the year.
- INDEXA, the International DX Association Inc, is looking for new members. If you want to become a member, send \$US15.00 to INDEXA, PO Box 607, Rockhill SC, 29731 USA. A daily DX information session is on 14236 kHz at around 2330 UTC.
- DXCC has approved the recent activities of the following stations for which QSL cards may be submitted at any time, 3V8BB, A51/JH1AJT, A51MOC, VI0ANT, VP8SGP and ZA/OK1CF.

### **QSLs Received**

P491 (3 w op K4PJ) — 9Y4VU (3 w 3WEWV) — Z32ZM (1 m op) — 3DA0Z (3 m ZS6EZ) — 9K2MU (3 w WA4JTK) — T320 (6 w WC5P).

### **Thankyou**

This column was made possible with the help of VK2DDR, VK2DEJ, VK2KCP, VK2KFU, VK4AAR, VK4CY, VK4MZ, VK5WO, VK6APM, VK6LC, ZL2VS, JA1UT, NI6T, P491 and 9V1RH, and the following publications, QRZ DX, The DX Bulletin, The DX News Sheet, INDEXA News Bulletin and DX Enterprises, publishers of the "GOLIST" QSL Managers list.

**73 and good DX**  
PO Box 93, Dural NSW 2158

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## **An Old Timer Reflects....**

Des Greenham VK3CO (SK) continues to look back over 50 years of amateur radio operation.

It was towards the end of the 50s that we were allowed to operate on 40 metres. At that time I was engaged in a job that took me all over the state of Victoria conducting tests with the PMG's Dept (now Telecom). To enable me to still follow my hobby I decided to build a portable transmitter and receiver for 40 metres.

This used a 6V6 and other valves readily available at that time.

The unit was constructed in a large box and had two watts output, AM of course. The receiver was the usual five valve superhet type and the whole thing operated from an external 250 volt DC power supply. This unit was described fully in Amateur Radio magazine of January 1947 under the heading of "The Terrific Two Watter".

This small unit worked many stations under the call sign of VK3ACO. In those days portable operation was NOT permitted with your home callsign. You were required to take out a special portable licence. On one occasion I was working at Echuca and, after hauling up a dipole antenna to the Post Office tower flag pole, I was able to get on air. One of the PMG line staff of the day was very interested. When I explained what I was doing and the frequency I was using, he understood the purpose. He then told me he had a "Dual Band Radio" at home and asked if I could be heard on this. When I told him it could be done, he went home full of enthusiasm.

That evening, I worked many stations around VK and ZL and I was very pleased with my night's activity. The next morning when I attended work my lineman friend was there to meet me. He was very excited and, in front of the entire staff, he told how he had heard me very clearly and didn't miss a word. I asked him where he lived and he told me that he "lived just past the water tower". This was a short distance from the Post Office and, from that time, I was always asked when I operated portable in town, "Are you getting past the water tower?"

This joke stayed with me for many years.

## **International Amateur Radio Union Monitoring Service (IARUMS) — Intruder Watch**

Gordon Loveday VK4KAL\*

The International Amateur Radio Union Monitoring System (IARUMS) is set up to record, report, and encourage the removal of non-amateur stations from amateur band allocations. Stations targeted are usually broadcast or commercial stations from other countries. Priority is not given to local "pirates". Each country appoints a Co-ordinator, who is responsible for collating reports and forwarding them to the appropriate regulatory authorities (the Spectrum Management Agency in Australia).

Each WIA Division, apart from VK3, has a Divisional Co-ordinator to collect reports from that Division and forward them to the Federal Intruder Watch Co-ordinator. But

the main strength of the service is in the individual amateurs who spend time regularly listening on the bands and identifying types of signals and stations.

More Intruder Watch listeners are always required. Volunteers who contact either their Divisional Co-ordinators or me direct will be supplied with information, log sheets and tapes to assist in identifying modes.

### **STOP PRESS**

I have received an official reply from the Posts and Telegraph Policy Department in Hanoi, Vietnam regarding the cessation of the VRQ transmissions on 14.285 MHz. The letter, signed by Nguyen Ngoc Canh, Deputy director, asks for any reports of VRQ being heard after 28 February 1995.

Would observers please check and report back to me of any such infringements.

Reports are also required of a flood warning system operating on 7.038 MHz SSB (ARS). The transmissions are possibly from Pakistan.

And also a broadcast station operating on 18.075 MHz with transmissions in the Hindi language with a Punjabi accent and the identification "Radio India". These transmissions are sometimes jammed by a military station.

\*Federal Intruder Watch Co-ordinator, Freepost No 4 Rubyvale QLD 4702 or VK4KAL@VK4UN-1

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**Help stamp out stolen equipment. Always include the serial number of your equipment in your Hamad.**

# Pounding Brass

Stephen P Smith VK2SPS\*

## Passive LC Filter

### Design

Continuing on from last month with details of the filter designed by Ed Wetherhold W3QNQ, I must apologise for the quality of the two diagrams and table. They were photocopied from material provided by Ed.

Figure 1 shows the schematic diagram and component values of three one-stack CW filter designs. The designs were selected for centre frequencies of 537, 750 and 800 Hz with termination impedances between 225 and 234 ohms so that standard 8/200 ohm transformers could be used. The filter needs a source impedance within ten percent of 234 ohms, consisting of the 200 ohm transformed 8 ohm source, the transformer winding resistances and the L1 inductor resistance. In a similar way, the filter needs a load impedance of 234 ohms.

For a centre frequency of 800 Hz, L2 and L4 are both 38.1 mH, a value which is obtained by removing about 250 turns (125 turn-pairs) from a bifilar-wound 88 mH inductor. The polyurethane film insulation does not need to be scraped off the inductor leads because the insulation vapourises if soldered with a 750 degree solder tip. Select the design having a centre frequency equal to the sidetone frequency of your transceiver.

## Construction

The pictorial diagram of Figure 2 shows the modified bifilar-wound inductor lead connections and the connections between the capacitor leads and the 88 mH stack terminals. To build either of the CW filters, obtain one 88 mH stack with a plastic mounting clip and two bifilar-wound 88 mH inductors and then follow steps 1 to 4.

1. Remove the number of turn-pairs (specified in the table under Figure 1) from one of the bifilar-wound 88 mH inductors to get the required 234 mH inductance. Twist the green finish and red start leads together to make the centre tap of L2 as shown in Figure 2. If the two leads are soldered with a 750 degree solder tip, the film insulation will vapourise leaving a clean solder connection. Tin the two remaining leads. Do the same with the other 88 mH inductor to make L4.
2. Fasten both of the modified 88 mH inductors to opposite ends of the 88 mH stack with clear silicone rubber

sealer. Position the modified inductors so their leads can easily be connected to the rest of the circuit. Solder the L2 and L4 inductor leads and the capacitor leads to the stack terminals as shown in Figure 2.

3. Obtain a suitable box and make holes for the inductor mounting clip, the DPDT switch and the phone jack and phone cord. Install transformers T1 and

T2 and the inductor/capacitor stack in the box. Fasten the transformers (with leads pointing upwards) to the bottom of the box with silicone rubber sealer. Secure the stack to the side of the box using a 1 3/8 inch component mounting clip fastened to the side of the box with two 6-32 x 7/16 inch screws.

4. Connect wires to the transformer, the DPDT switch with resistor R1, and the phone jack and phone plug. Then check the correctness of your wiring by measuring and comparing the filter node-to-node resistances with their values listed in Table 1.

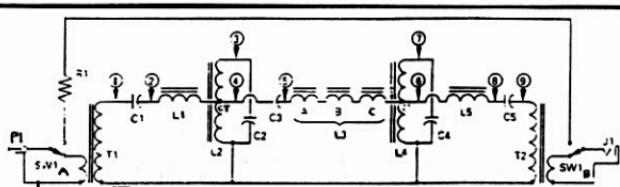


Figure 1. Schematic diagram of 5-resonator cw filter.

### CW FILTER DESIGNS USING MODIFIED 88-mH BIFILAR-WOUND COILS FOR L2 & L4

| Center Freq. (Hz) | 537  | 750   | 800   | FOR ALL DESIGNS:                |
|-------------------|------|-------|-------|---------------------------------|
| 3-dB BW (Hz)      | 280  | 236   | 250   | L1, 5 = 88.0 mH                 |
| Percentage BW     | 52.3 | 31.5  | 31.3  | L3 = 3x88 = 264 mH              |
| C1, C5 (nF)       | 1000 | 512   | 450   | T1, 2 = 8/200 ohms c.t.         |
| C2, C4 (μF)       | 1.00 | 1.036 | 1.039 | R1 = 6 to 100 ohms              |
| C3 (nF)           | 333  | 171   | 150   |                                 |
| L2, L4 (mH)       | 88.0 | 43.5  | 38.1  | USE 1% CAPS FOR BEST RESULTS    |
| T-P to Remove     | NONE | 109   | 125   | SEE TABLE 1 FOR THE APPROXIMATE |
| R1-Term (ohms)    | 234  | 230   | 230   | NODE-TO-NODE RESISTANCE VALUES  |

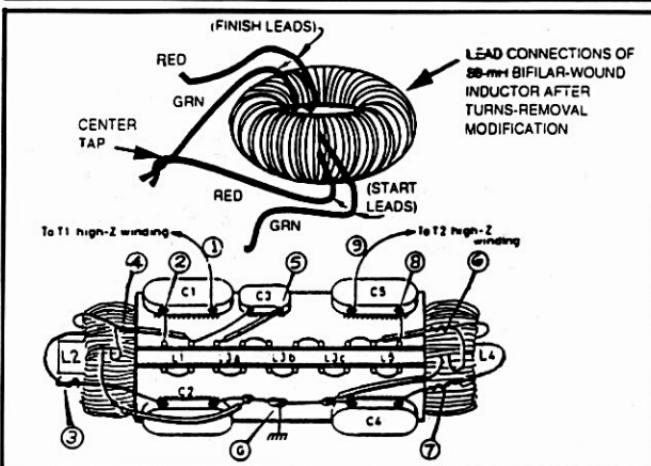


Figure 2. Pictorial diagrams showing the L2 and L4 lead connection and the wiring of the inductor stack.

Table 1. Node-to-node resistance for the 800 and 537-Hz filter designs.

| NODES<br>From To | COMPONENTS      | RESIST.<br>(Ohms) | FOR FC+<br>537 Hz |
|------------------|-----------------|-------------------|-------------------|
| 1 GND            | T1 Hi-Z Winding | 12.0              | 12.0              |
| 2 GND            | L1 + 1/2(L2)    | 9.9               | 11.3              |
| 3 GND            | L2              | 4.7               | 7.5               |
| 4 GND            | 1/2(L2)         | 2.35              | 3.8               |
| 5 GND            | L3 + 1/2(L4)    | 24.9              | 26.3              |
| 6 GND            | 1/2(L4)         | 2.35              | 3.8               |
| 7 GND            | L4              | 4.7               | 7.5               |
| 8 GND            | L5 + 1/2(L4)    | 9.9               | 11.3              |
| 9 GND            | T2 Hi-Z Winding | 12.0              | 12.0              |
| 2 4              | L1              | 7.5               | 7.5               |
| 5 6              | L3              | 22.5              | 22.5              |
| 6 8              | L5              | 7.5               | 7.5               |
| 2 3              | L1 + 1/2(L2)    | 9.9               | 11.3              |
| 6 7              | L5 + 1/2(L4)    | 9.9               | 11.3              |

See Figure 1 and 2 for the filter node locations.

## Installation

Transformers T1 and T2 match the filter to your receiver low impedance audio

output and to an eight ohm headset or speaker. If your headset is high impedance, omit transformer T2 and connect a 1/2 watt resistor from node 9 (C5 output lead) to ground so the parallel combination of the headset resistance and the resistor gives the correct filter termination impedance within ten percent of 230 ohms. Resistor R1 helps to maintain a constant audio level in the headset or speaker when the filter is switched in or out of the circuit. The value of resistor R1 is determined by trial and error, and its value (between six and 100 ohms) will depend on your audio system.

## Performance

The measured 30 dB and 3 dB bandwidths of the 800 Hz filter are about 557 and 250 Hz, respectively, and the 30/3 dB shape factor is 2.23. The 2.7 dB insertion loss at 800 Hz is compensated by slightly increasing the receiver audio gain. I will conclude this series about the passive filter next month.

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## QSLs from the WIA Collection

Ken Matchett VK3TL\* Honorary Curator WIA QSL Collection

### Easter Island

Easter Island, lying in the south-east Pacific Ocean, must be one of the most isolated spots on earth. It is 1900 km east of Pitcairn Island and 3700 km west of Chile. The island derives its name from the fact that Europeans, under the Dutch admiral Jakob Roggeveen, landed there on Easter Sunday in the year 1722. It was a single day's visit by the explorer.

Since that year the island has had several visitors, amongst them the

Spanish, Peruvians, French and Captain James Cook (in 1774 during his second voyage to the South Pacific). In 1888 the island was annexed by Chile, which country used it solely for sheep raising (it wasn't until 1954 that the Chilean Navy took over the sheep range). In 1965 full Chilean citizenship was granted to the islanders.

Many tragedies must have befallen the population of the island. It has been estimated that the island once supported

several thousand inhabitants but, by the 18th Century, numbers had dropped precipitously. This is thought to have been due to the depletion of natural resources and inter-tribal conflict. By the time Peruvian slave traders had done their work the population was to be measured in only hundreds. The present population has grown to about 2,500 but few are of original Polynesian descent.

### CEOAE

Undoubtedly the most known feature of Easter Island is its 600 or so stone statues (moai). Some of these are reproduced on the QSL card CEOAE of Fr David Reddy, probably the most active operator from the island who was also an excellent QSLer. He provided many DXers with the island contact from the early 1970s to the early 1980s. This particular card was sent to the late Col Chirnside VK3WQ for a QSO in March, 1981. The statues are truly remarkable. Many stand nine metres in height and weigh more than 20 tonnes. There is no mystery about the source of the volcanic rock from which the statues are carved; the mystery lies in the method by which the gigantic blocks were transported from the central volcanic interior of the island to the shore.

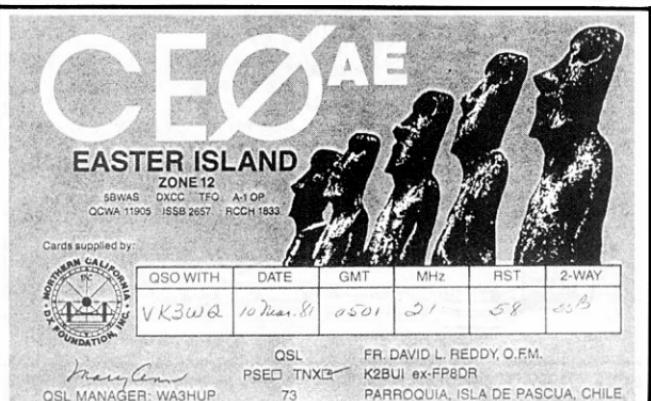
### SM2AGD/CEO

Not surprisingly there have been several DXpeditions to Easter Island. This imaginative QSL card from Eric SM2AGD/CEO was sent to the writer when he was active from Nauru Island as C21TL in 1972. The words Rapa Nui on the card are the native (Polynesian) name for Easter Island. Also on the card may be seen the many stone pavements which are associated with the statues.

One of the first radio operations from the island after World War 2 was that of CEOAC. This was the call-sign of Chilean Air Force (Fuerza Aerea de Chile) personnel stationed at Mataveri airport. The new prefix CEO was first used, however, in 1953 by CE3AG who operated from the island with the call CEOAA during August of that year, the new prefix appearing in the ARRL's Countries list in the January 1954 issue of *QST*. The island's name had first appeared in the Post-War Countries list published by *QST* in February 1947 but it was, like several "countries", listed without prefix.

### W6KG/CEO

The most successful of all DXpeditioners, Lloyd Colvin (now, regrettably, a 'SK'), together with his XYL, Iris W6DOD, worked a great proportion of the world's DX chasers. They operated from over 300 countries whilst connected with the Yasme





Foundation. This QSL from Isla de Pascua (Spanish for Easter Island) was for a QSO in March 1984 with well known ALARA foundation member and DXer, Mavis VK3KKS.

Virtually the whole of Easter Island's economy is dependent upon tourism, the main attraction, of course, being the mysterious stone statues. But there are other attractions such as pristine beaches and crystal-clear waters. The volcano Rano Kao, with its steep crater, is yet another drawcard. Hire cars are available on the island but accommodation is both expensive and limited. Chilean pesos or American dollars suffice for local currencies. Now declared by Chile to be a national monument, considerable attention has been given to the island's tourist development and environment protection (unfortunately, some damage is occurring to the statues mainly through fungal attack, erosion and, regrettably, souvenir hunters). Flights to Easter Island are conducted by Air New Zealand, Lan Chile and Qantas, no visa being required by Australian nationals.

## Thanks

The WIA would like to thank Mike VK6HP, Alf VK3LC, John VK3WJ, "Snow" VK3MR, Roth VK3BG, Ivor VK3XB, Mavis VK3KS, Wim SP5DDJ and Bob VK3XZ (courtesy of "Snow" VK3MR) for their kind contribution to the Collection (supplementary list).

Also the family and friends of the following "SKs" (supplementary list), Bill Hodder VK5LY (courtesy of Rowland VK5OU), Jim Ballinger VK3NK (courtesy of Tom VK3AGH), Reg Gibson VK3GX and Jim Stewart VK3AS.

## **Author's Note**

Would you, the reader, like to make a contribution to this National Collection? Commemorative QSLs, rare prefixes and DXCC countries, pictorials and QSLs of a thematic nature are in greatest demand. Please contact the Hon Curator, who is also the author of this series of articles.

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# **Repeater Link**

Will McGhie VK6UU\*

## **Tune Up**

Last month's *Repeater Link* promised how to tune up the converted FM 828 E Band to six metres. Having looked at the tune up it is basically the same as the already published tune up instructions in *Repeater Link* for November 1994. If you follow the tune up instructions as published, the E Band 828 should have you on six metres FM. The all important VCO lock may be a problem area, as there are several modifications required to move the VCO down in frequency. Hopefully, the modifications as shown in last month's article worked and the tune up is straight forward.

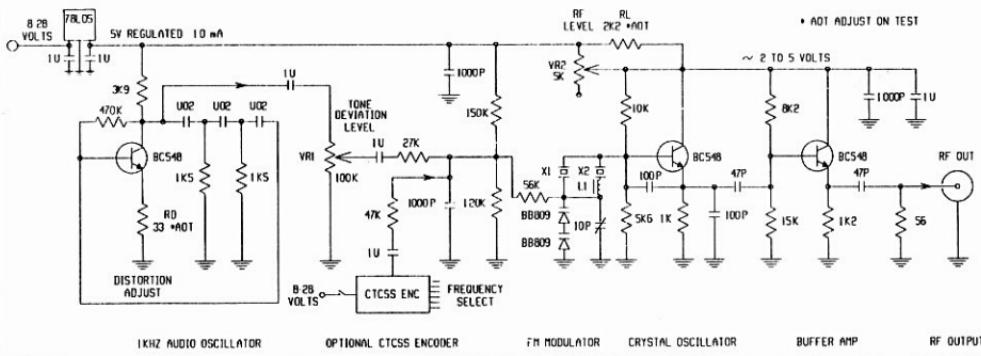
To tune up the receiver a signal source is required. Waiting for an off air signal can be frustrating, particularly as the 828 is crystal locked. As a suggestion, use the second harmonic from a HF transceiver in the CW or FM mode. For example, the second harmonic of 26.5 MHz is 53 MHz. If your HF transceiver can transmit on half the receive frequency of the 828, then you have a signal source. Caution is required, transmitting 100 watts or so into the front end of the 828 will do a lot of damage. I made up a 30 dB power attenuator consisting of a 50 watt 50 ohm resistor combination, followed by a 1.5 k $\Omega$  quarter watt resistor, into a 56 ohm quarter watt resistor. A basic pi network that isolates the 100 watt transmitter from the 828 receiver. At worst I could only apply 100 milliwatts to the 828 front end. There was still lots of second harmonic left to tune up the 828.

## Signal Generator

While on the subject of signal sources, I received a query via packet from Lloyd VK5LL, inquiring about a signal generator for two metre repeater receiver maintenance. Test gear is the one thing we all don't have enough of, and many amateurs won't devote the time to build test gear, as it looks too hard. However, sometimes simple test gear can be made, that is worth its weight in gold. It saves time and frustration when it comes to checking repeater systems.

Many years ago I had constructed a crystal oscillator from a surplus crystal that produced harmonics all the way to 70 cm. The crystal oscillated around 4 MHz and produced 50 microvolts or more on 2 metres. However, as useful as the signal generator was, it lacked several features. With Lloyd's query I decided to redesign the crystal signal generator with the features the earlier design had missing.





Crystals

As the signal generator is crystal locked, my design was based around a source of surplus crystals from the ICOM IC22a and the FM 828. These two radios use the same frequency range of around 18 MHz. The only difference is that the IC22a crystal is frequency adjusted with a series capacitor and the FM 828 crystal with a series inductor. Both crystals oscillate in the crystal oscillator circuit but, if you place an FM 828 crystal in the series capacitor tuned circuit, the frequency can be 200 kHz high or more, on its harmonic on two metres.

The reverse is also true if you place an IC22a crystal in the series inductor circuit. However, this is an advantage and has been utilised in the design. Note the two crystals shown, X1 and X2. These are in reality the crystal sockets into which a single crystal is plugged, an IC22a crystal into the series capacitor tuned, and an FM 828 crystal into the series inductor tuned. Note, only one crystal at a time. By swapping crystals between the two sockets, various frequency combinations can be achieved. An FM 828 crystal with a two metre harmonic on 146.825 MHz, will produce a two metre harmonic several hundred kHz higher up, when plugged into the IC22a socket. With a bit of experimenting all sorts of frequencies can be covered with very few crystals. Both C1 and L1 are adjustable for netting.

Depending on the crystal, up to 30 kHz or more of frequency shift can be achieved with C1 or L1. L1 is a surplus frequency netting inductor from an FM 828 exciter board. I had to rewind the coil on this inductor, doubling the number of turns. The reason being the added series capacitance in the FM modulator. This raises the frequency and the standard coil may not tune down to the original crystal frequency.

## **Crystal Harmonic RF Signal Generator**

## **Harmonics**

Having access to a spectrum analyser made this project easy when it came to looking at what harmonics were present, and at what level. The original circuit used a 12 volt power source, and the harmonic level at two metres was around 1000 microvolts. At 70 cm there was about 50 microvolts. There is a gradual falling off of harmonic energy, with usable amounts up to 1296 MHz!

Note the oscillator transistor is the common BC548 "audio transistor". I like using easy to obtain components and the BC548 was tried and worked well. Each

higher harmonic is not necessarily smaller in amplitude than the harmonic below it. There is a "wave pattern" in the harmonic level as viewed on the spectrum analyser, but an overall falling in level as the frequency rises.

That's all we have space for in this issue. In next month's Repeater Link I will conclude the description of the crystal harmonic RF signal generator, covering Level, FM Modulation, Varicap Diode, Tone Source, Deviation, CTCSS and Construction.

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## **Spotlight on SWLing**

*Robin L Harwood VK7RH\**

The planned changeover of the BBC World Service into seven regional services took place on Saturday, 1 April. It is quite unusual to hear the "Beeb" with different releases on-air simultaneously. This looks as if there was wholesale rescheduling of their output and I am presently looking for an updated frequency list to know what's what.

If you're a regular BBC W/S listener, I would suggest that you contact them at their London address at Box 76, Bush House, London UK WC2B 4PH. A lot of regular programs have been rescheduled to fit in with this regionalisation into different timeslots. I notice that all services seem to carry various programs such as "Newsdesk" plus hourly news bulletins at the same time, although releases of "Newsdesk" for European listeners seems to be an hour earlier to take account of local Summer time.

If you wish to hear the different

releases, I suggest that you try at around 1100 to 1200 UTC. The European releases are on 15070, 12095 and 9410 kHz, whilst the North American release is best heard on 9515 kHz from Sackville NB. The BBC Kranji (Singapore) relay has programming for this area. The BBC Eastern relay at Masirah, just off Oman, is on 15310 kHz. All are airing different programming which means that, if you don't like what is on, you can tune in to another regional service for alternative fare, depending on propagation, of course.

I'm certain that the Ascension Island and Seychelles relays are probably broadcasting alternative releases for Africa. Incidentally, "Newsdesk", which was at 1100 UTC, has been retimed to be one hour earlier but no relay from the NZ site. So, we will have to rely on Kranji, yet the same program is carried by the ABC Newsradios Network simultaneously, that is if Parliament is not sitting!

In mid-March the World was horrified to hear of the fatal gassing of 11 people in Tokyo. A nerve gas called Sarin was used by terrorists at a crowded subway station in the morning peak hour. 5,000 others were affected and a massive police investigation was launched. Evidence began pointing to a shadowy Doomsday cult called "Aum Shinrikyo" or "Supreme Truth" led by Mr Asahara. SWLs quickly realised that it was the identical organisation that used to air their programming twice daily in English over Radio Moscow International. Their pronunciation was poor, rendering large chunks of the program unintelligible. We know that the Russians were eager for hard currency at the time and were happy to slot two thirty minute daily releases over their World Service. Then, as suddenly as it commenced, programming was cut in mid-1994. This coincided with the group tackling internal divisions, although programming in Russian, Japanese and an English release over a MW sender in Kaliningrad for Europe, continued.

Following further police investigation in the cult's headquarters and at many other sites, dangerous chemicals used in the manufacture of Sarin were found. Evidence also emerged of torture and kidnapping by the cult of several disaffected members who attempted to leave it. The cult's guru, Asahara, disappeared and, as I write this, is Japan's most wanted man. Embarrassed Russian broadcasting officials quickly yanked remaining programming off the air as the scale of the cult's operations became clear, leading to an investigation by Russian police and security officials of the cult's involvement there. The authorities quickly banned it as it had never sought registration. The cult claimed 30,000 members in Russia, particularly in the Far East, but Russian estimates put it at only 1,500 to 3,000. The majority were, of course, in Japan but there were pockets of membership in Asia and in other regions, thanks to the Radio Moscow relays.

Radio "Aum Shinrikyo" was eager to receive money and responses for their dubious output and even issued QSL cards for their station which, in turn, prompted several listeners to query whether they had been impregnated with Sarin. Anyhow, the next we are likely to hear about Mr Asahara and his shadowy "Aum Shinrikyo" group is from the Japanese investigations and the resulting court cases.

I have had several problems of late accessing the Internet and Fidonet echoes. My Internet problems revolve around a software problem associated with receiving the Unix system of my

provider. I think that I have almost cured this now by changing the emulation. As for Fidonet, it looks as if they are plagued by some internal policy problems with receiving feeds from the Usenet/Fidonet gateway. The result is that I haven't been able to acquire the rec.radio.shortwave echo satisfactorily through either system. Also, I don't know what has happened to the OZ\_SW echo on Fidonet as it dried up in February. Hopefully, it will be all sorted out soon.

I have assumed further responsibilities with the Tasmanian Division, which means that time for monitoring will have to take second place. However, I am hopeful that I will be able to continue to take time to earwig about.

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## VHF/UHF — An Expanding World

Eric Jamieson VK5LP\*

All times are UTC.

### The G A Taylor Medal

No one was more surprised than I when a letter arrived from Donna Reilly, Manager of the WIA Federal Office, advising that I had been awarded the above medal, the WIA's highest honour, by the WIA Federal Council, "*In recognition of meritorious service to the Federal Body and Amateur Radio magazine.*" Confirmation of the award appeared in the March 1995 issue of *Amateur Radio*.

This medal follows the receipt of the Publications Committee Higginbotham Award announced in the February issue of *Amateur Radio*.

I feel very humble, but honoured and appreciative that my efforts in writing *VHF/UHF — An Expanding World* for the past 25 years have been so recognised. The monthly task was often not easy for a variety of reasons.

Sometimes it was a shortage of material and, to gather news, the regular need to telephone leading operators halfway across Australia. No matter how well I felt personally, there was always a printing deadline to meet and the on-time receipt of my notes in Melbourne rested entirely with the efficiency of the Postal Service, which often left much to be desired.

There has always been a nucleus of people who send regular letters containing useful news, so I gratefully acknowledge their support. There were the times when, if I said a word out-of-place or dared to make a suggestion/statement/allegation without naming a person, then I would be "hauled over the coals" for not being specific.

During the past five years I have been the recipient of letters and phone calls with disparaging references to others and the way they operated. However, this is a territory of mine where I have some expertise in handling people, which

enabled me to resolve the matters, to a sufficient degree anyway, so that the least harm resulted to the amateur radio movement of this country.

However, all has not been "doom". There have been many pleasanties associated with writing these notes, the nice people I have met at conventions, the amateurs calling at my home, the pleasing and encouraging correspondence and phone calls, the Christmas cards and Get-Well cards, the support from the Editor and staff of *Amateur Radio* magazine, and the belief that what I was trying to do was always for the benefit, encouragement and well-being of the amateur fraternity, particularly in the sphere of VHF/UHF communications.

My writing of these notes almost ended five years ago, when I became confined to a wheelchair but, by coming-to-terms with my affliction, which has not been of my own doing, and with the gradual upgrading of computers, my total output from the keyboard has actually increased, first with the continuation of these columns, the writing of several books, and involvement in sundry community projects such as the Area School library, the History Centre, church newsletters and material for other publications. My present world is very busy.

Finally, the following extract from Donna Reilly's letter may be of interest — it was to me! Major George Augustus Taylor was the founding Chairman of the Wireless Institute of New South Wales in 1910 out of which grew today's Wireless Institute of Australia. He was a pioneer in many ways, granted one of the first transmitting licences under the 1905 Wireless Telegraphy Act. He was among the first ten wireless experimenters to have been licensed by the PMG Department, transmitting the first military wireless signals in Australia. He conducted the first wireless communication between moving trains and was the first to fire a gun by wireless.

Any problems which I faced seem small by comparison with those confronted by Major Taylor when entering the fledgling wireless industry of 1910. But, thank you everyone, including those people who wrote letters of congratulations and contacted me by telephone. Your interest is appreciated.

## Six Metres

Costas SV1DH and Nick SV1EN have written with a correction to my "VKs First Worked List." They advise that the first station worked in Greece from Australia was on the same day (17/10/89) when VK4VV worked SV1EN at 0706. My entry was VK8RH to SV1DH at 1335. List corrected.

Costas and Nick congratulate VKs for working 173 countries. The total from SV stands at 151 countries and SV1DH, SV1EN, SV1OE and SV1OH already have their DXCC for 50 MHz, while SV1AB and SV1UN have submitted theirs and SV1AHP and SV1AHX expect to claim theirs in 1995. They report that presently there are no more than ten active six metre operators in Greece, but the SV team is preparing for a more organised and powerful appearance on six metres during the next solar cycle. Thanks for writing.

A very welcome QSL which arrived on my desk was verification of my first contact with VK0IX, Casey Base, Antarctica, on 14/1/95 at 1135. As I was unable to work Europe during Cycle 22 I cannot join VK3OT, VK5NC and VK5KK who form a very exclusive world club of operators to have worked seven continents on six metres.

## Six metre DX records

Cycle 22 saw every six metre DX record broken from all states of Australia. **VK1RX** worked **KP4A** on 8/4/91 at 16,082 km. **VK2FLR** worked **N6AMG/CU3** on 27/11/91 at 19,424 km. **VK3OT** worked **GW3MFY** on 19/2/91 at 16,924 km. **VK4KK** worked **G4CCZ** on 15/2/92 at 16,515 km. **VK5NC** worked **GJ4ICD** on 18/10/91 at 16,808 km. **VK6RO** worked **GI8DYZ** on 28/2/90 at 14,904 km. **VK7IK** worked **PA0LSB** on 8/2/92 at 17,053 km. **VK8RH** worked **8R1AH** on 2/4/89 at 18,858 km. **VK2BBR** worked **JH1WHS** on 28/4/91 for a new digital mode contact. **VKAZAZ** worked **FM5WD** on 6/4/91 at 16,243 km for a mobile contact. **VK3OT** made the first-ever VK six metre EME contacts on 7/11/93 with **K6QXY** and **W6JKV**.

**VK3OT**, **VK3LK** and **VK5NC** worked the continent of Antarctica for world first contacts. VK3OT, VK5NC and VK5KK are the only stations in the world to have worked all seven continents on 50 MHz.

There are four contentious long-path records with which some disagree: **VK2BA** and **VK3OT** to **9Q5EE**, **VK6JQ** to **TL8MB**, all in the 26,000 to 28,000 km distance. **VKAZAZ** to **9LIUS** at 22,550 km. Permission from **VK3OT** to use the above information.

## Beacons

Courtesy of **Dave VK2KFU** I received a fax which originated as e-mail from Geoff GJ4ICD advising of a new beacon, V31SMC at Belize on 50.035 MHz, FSK, 10 watts output and active from April 1995. It was built by GJ4ICD and GJ3RAX.

The *West Australian VHF Group Bulletin* reports that Wally VK6KZ has reinstated the VK6BRS beacon following repairs to the transmitter. It now appears work is necessary on the antennas requiring a brave soul to climb the tower!

The Beacon Committee is considering resiting the VK6RPH beacons. The 1296 MHz beacon is being rebuilt by Al VK6ZAY and Don VK6HK.

## Two metres

With apologies to John **VK5PO**, I can now give you the comprehensive list of two metre activity which John experienced during December and January. His original list simply disappeared from my desk!

**SSB** — 16/12: VK3ZQB, 29/12: VK3CY, VK6WG, 30/12: VK6APZ, VK6KZ/p, 31/12: VK3CY.

**FM** — 27/12: VK3ZGL, 29/12: VK6WG, 30/12: VK6VXP, VK6KZP, 31/12: John said, "He had one hell of a time on two metres!" — VK5KCX via VK7RWC, VK7KT (John's first VK7 on two metres), VK3CY, VK6QB (on the extreme west coast of WA). Between 1200 and 2145 John logged the following repeaters: VK2s RBH, RGF, VK3s RBA, RBS, RCR, RCV, RDU, REC, RGV, RMA, RML, RMM, ROW, RSG, RSH, RVL, RWG, RWL, RWZ, VK5s RAC, RAD, RBU, REP, RHO, RLD, RLH, RMG, RMN, RNC, RSV, VK6s RAW, RBN, RMS, RMW, RWM. VK7s REC, RMD, RNW, RWC. **VK3RMM** on 439.275 MHz. .... The distances varied from relatively close VK5s to VK6s at about 2000+ km. Some signals were 5x9 +60dB. A most interesting list and indicates the extent of the wide-spread Es coverage.

**SSB** — 5/1: VK2ZAB for John's first VK2 Es QSO, VK2DXE, 13/1: 0422 to 0502 — VK2s MZ, FLR, VC, ZRU, BBF, 15/1: VK3s ZQB, CY, BRZ, VSW and DNA on FM, VK8SMS/3 FM mobile near Maryborough, Victoria; a total of five hours propagation.

Thanks John for the information. Once again, this supports my long-held view that the low part between solar cycles provides the best Es!

## Contest Results

John Martin VK3KWA sent me a copy of the Ross Hull and VHF-UHF Field Day results. Roger **VK3XRS** won the Ross Hull for the sixth time in succession with 9683 points, overtaking the original top winner, Kerry VK5SU, with five wins from 1971 to 1976. Second place went to VK6KZ with 8872, followed by VK2ZAB with 6749 points. VK6KZ used a total of seven bands and was the only contestant to do so. Three contestants used six bands.

Since 1950 the Ross Hull has been won 20 times by VK3, 7 by VK4, 13 by VK5 and 5 by VK6. In each group, there are 9 callsigns involved in the VK3 wins, 5 for VK4, 6 for VK5 and 2 for VK6. During the contest, on 3 cm VK6KZ and VK6BHBT set a new state and national record and VK6KZ and VK5NY set a new world record, details outlined previously.

Field Day results: Section A — portable, single operator, 24 hours to VK2TWR with 3376 points; Section B — portable, single operator, 6 hours to VK3AFW with 2874 points; Section C — portable, multi-operator, 24 hours to VK3ATL of the Geelong Amateur Radio Club; Section D — home station, 24 hours to VK3DEM with 4609 points. The most notable contact was a new VK1 record between VK1DO and VK4OE/2 on 1296 MHz.

After a long spell of dry weather, the clouds opened on the Field Day in portions of South Australia. Alan VK5BW made it to his hill-top site but John VK5AJQ could not due to a track turned into quagmire, being thwarted three km from Alan. They abandoned their portable expedition and their presence was missed on the bands.

## John Moyle Field Day

Doug VK4OE writes that conditions were a little better than average, but finds it curious that the prevalence of FM only on the VHF bands has created nearly a generation of amateurs who believe that their normal world stops at about 100 to 150 km. This is reflected by the rules for scoring in the John Moyle contest.

VK4WIE/4 operating from Mount Wolvi near Gympie approximately 125 km north of Brisbane, VK4KAC/4 at Howells Knob near Maleny and 60 km north of Brisbane and VK4OE/2 operating from a hill near Byron Bay, NSW, 150 km south of Brisbane, were the three stations "in the field." Byron Bay is the most easterly point on the Australian mainland. Operating in the field places a VHF/UHF operator in a significantly better location than the typical home station, enabling the "DX horizons" to be pushed further afield.

The above three stations readily made contact on 144 MHz plus numerous

contacts locally by each using FM on this band. On Sunday morning Bernard VK4KAC/4 worked Harry VK4LE near Springsure for a distance of 530 km. Harry operates early each morning on 144 and 432 MHz and has noted many inland "lift" conditions over the years between 5 and 7 am local time. Harry has documented these years of experiences.

Contacts over 600 km paths on 144 and 432 were possible most of the time down the coastline to Sydney stations, notably Gordon VK2ZAB, Mike VK2FLR and 700 km to Norm VK2ZXC at Port Kembla. On 1296 MHz VK4WIE/4 and VK4OE/2 successfully completed a Sunday morning SSB contact over the "far-from-being-all-clear" path of 285 km. VK4WIE/4 was a multi-operator station with Eric VK4NEF handling the VHF/UHF contacts. He has been captured by the wonders of these bands so maybe he will upgrade to allow him to operate there.

Lyle VK2BE in southern Sydney and VK4OE had a difficult contact on 432 and were tempted to forget 1296, but on aligning their antennas found the band better than 432, resulting in a comfortable conversation. The 635 km path is "non-aircraft enhanced" and was obviously coastal ducting.

Doug concludes by saying that the often superior contacts on 1296 compared to 432 adds weight to the well-established argument that temperature-inverted ducts often permit transmission of microwave frequencies before UHF, and UHF before VHF. A case in point is the recent 10 GHz contact across the Great Australian Bight between VK5NY and VK6KZ.

## Overseas News

In April issue of *Amateur Radio* I gently chided Geoff GJ4ICD for the one-and-a-half line reference to the world-record 10 GHz contact between VK5NY and VK6KZ. This brought a response in a letter that he was only the writer, not the editor and space is often at a premium. However, I note that July *HRT* compensates with an in-depth coverage of the VK0IX saga. Thanks Geoff — but no harm intended!

Geoff GJ4ICD is now on E-mail Internet with the address [equinox@business.co.uk](mailto:equinox@business.co.uk) and looking for VKs willing to keep in touch with him.

Other points from GJ4ICD include confirmation of the Cape Verde Expedition from 1-14 June with the callsign D44BC. Details were given in last issue of *Amateur Radio*. 3A2LZ Monaco and 3V8BBB Tunisia are now operational. There will be no licensed operation from SO — Western Sahara according to the ARRL.

Geoff says if you are unhappy with the

noise blanker in your FT650 then try shorting out diode 4013, which will increase the gating time of the AGC line to the noise blanker. The diode is located on the IF board and the modification improves the noise blanking by several S points under heavy power line noise.

Ted Collins G4UPS reports the Gibraltar beacon on 50.035 MHz returned to air from January. In addition to his regular daily skeds with SM7AED, G3CCH and OZ7DX, February "pickings" have been poor. Worked 2E1DLC, F1MCF, LA1IC, OH1SIX, OZ3ZW, OZ7DX, SM3EQY, SM7FJE. Five GB3 beacons heard plus OH1SIX, OZ6VHF and OZ7IGY. Seems like most of the European six metre operators have placed the dust covers on their gear!

Emil Pocock W3EP in April's *The World Above 50 MHz* gave good coverage to happenings on 10 GHz including a substantial coverage of the VK5NY to VK6KZ world record. Emil notes the high interest in the band in Europe and reports the extensive 10 GHz beacons coverage. Ten are operating in England and at least 30 or more across the remainder of Europe.

On 50 MHz Emil reports the second half of winter Es openings on 1, 6, 7, 8, 18, 19, 22, 30 and 31 January. Most events lasted an hour or two and were limited to one-hop distances. From this it seems the US enjoyed more winter activity than Europe, or did they simply keep using their gear?

In his *VHF/UHF Microwave News Section* Emil recorded a report from OZ9ZI of the 1994 Danish Microwave Activity Week. The Danes constructed twenty DB6NT design 47 GHz transverters running 100 mW each to 25 cm dishes, thus assuring good activity on 10, 24 and 47 GHz. In addition there were several 76 and 145 GHz stations using Russian-made diodes for harmonic mixers.

Although weather conditions were poor, the results were gratifying. OZ/ON6UG

and OZ1UM made the longest 24 GHz contact at 90 km. All the 47 GHz stations made contacts with the longest being 38 km. OZ1UM and DB6NT made an 11 km contact on 76 GHz for a new Danish record.

On 145 GHz OZ1UM and DB6NT made a 1.1 km SSB contact at 5x6 both ways. A few days later OZ1UM and OZ9ZI set out to span the same 11 km path on 145 MHz they had first used in 1983 for early 10 GHz tests. They chose 47 GHz for liaison and easily established the link. The 145 MHz contact was nearly as easy, save that the exceedingly sharp beamwidths from the 25 cm dishes made alignment more difficult. OZ9ZI believes this now constitutes a new 145 GHz world record. Output power was considerably less than 1 mW and the receiver nf 13 dB. Congratulations from Australia. German amateurs have claimed world-record contacts on 76 GHz at 77 km and 241 GHz 0.5 km.

## Closure

From the lack of information it seems the recent equinox was not spectacular in its performance, indicated by the overall absence of operating news. However, it is worth repeating again that six metres is not dead. There will be Es during June and July and, as the band of surprises, something outstanding can occur at any time. So, leave the dust covers off your gear!

Closing with two thoughts for the month:

1. There are several good protections against temptation, but the surest one is cowardice, and
2. Possibly the factor that makes the adult-youth controversy more difficult than ever is that for the first time parents are outnumbered. Worse yet, they can't blame it on the children.

## 73 from *The Voice by the Lake*

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## Silent Keys

Due to space demands obituaries should be no longer than 200 words.

The WIA regrets to announce the recent passing of:-

|                 |       |        |
|-----------------|-------|--------|
| V L (Vic)       | COLE  | VK2VL  |
| F W (Frederick) | EADE  | VK2AEE |
| Alan            | NOBLE | VK3BBM |
| W               | EVANS | VK6QN  |

### Victor Lionel Cole VK2VL

It is a sad duty to report the passing of Vic VK2VL, of Sussex Inlet, who joined

the ranks of the silent keys on 8 March 1995, at the age of 84.

First licensed in 1936 as VK2ASC, Vic changed to VK2VL when he resumed activities after WW2. He was active in the old Lakemba radio club and a past president of the WIA NSW Division.

Victor was an electrical engineer and was employed by the United Condenser Company for a time. He saw service in

WW2 as a Captain in the Signals Corps, and rose to the rank of Major. He remarried at Nowra in 1978 and he and Lilius lived at Sussex Inlet for the past 16 years.

Vic played a large part in the re-organisation of WICEN some years ago in Sydney and remained active as South Coast co-ordinator for many years. He was very active as an operator and serviceman with the Sussex Inlet Coastal Patrol and was also an active member of the Mid South Coast Club.

A quiet and modest man, Victor will be sadly missed by all his friends on the South Coast. We extend our sympathy to his children, Barbara and Barry, and to Lilius.

**Stan Bourke VK2EL**

### **Frederick William Eade VK2AEE**

Frederick W Eade of Kotara, Newcastle passed away suddenly on 22 January 1995. Fred was born (in 1917) and educated in Armidale. On leaving school he started apprenticeships in the Boilermaking and Electrical trades. However, both firms became insolvent owing to the depression.

He then joined the army, attaining the rank of Sergeant in the Signallers Corps.

After leaving the army Fred worked at BHP, firstly as Electrician and then as Electrical Engineer. Later still he was Engineer at Hunter Valley County Council in Maitland and Queen Street Newcastle from where he retired. He also taught Electronics at Wood Street Tech part time.

As a young man Fred became interested in amateur radio and maintained that interest throughout his life, making a lot of contacts with overseas hams. In recent years he has tested young "Hams" for their certification.

His other interests were computers, choir singing and Masonic activities. He is survived by his wife Else, six children, eight grandchildren and one great grandchild.

**Paul G Hanna VK2NPH  
On behalf of Fred's widow.**

### **Alan Noble VK3BBM**

With sadness we record the death of Alan Noble VK3BBM, aged 61, who passed away on Easter Saturday while working on his radio mast and antennas.

Alan was known through his many years involvement in the administrative side of the WIA both at a Federal and Victorian level. He was also active in WICEN Victoria. He served as WIA Victoria President 1980-81, 1982-83 and 1986-7. During most of that period, while on the WIA Victoria Council, Alan also

held the position of VK3 Federal Councillor.

He was re-appointed Federal Councillor in March 1994 and held that position at the time of his death. Alan's interest in radio and electronics stemmed from his boyhood when he used to build receivers and other projects. Exposure to amateur radio later in life led him to study and qualify for his callsign and immediately he adopted a truly hands-on approach to the hobby.

Alan had strong, passionate feelings about amateur radio and, with an intensity, took up several key causes. He was a stickler for detail which often helped when dealing with issues. Two matters in which he made high level contributions were municipal controls on radio masts, and Ash Wednesday.

Alan played a major role in the two years leading up to the parliamentary inquiry into radio masts in 1983, including co-writing WIA Victoria's written submission. His depth of knowledge about the complex matter of radio masts, and willingness to act as an advocate for radio amateurs, saw him help many navigate their way through municipal barriers to radio masts.

On the terrible night of Ash Wednesday, when the state was ablaze, Alan was on air as the first reports of life and property losses were received. As the human tragedy unfolded he found himself in charge of a net that led to amateur radio's formal activation and involvement in the disaster.

Throughout his service to our hobby, Alan was equally comfortable being at the helm in control, or playing a low-key role assisting others. He was always available when his counsel was sought, or contribution required. Alan gave with a selflessness which typified his love of amateur radio. But, even though extremely busy aiding the WIA, he always found time to enjoy his hobby, being a communicator, home-brewer and experimenter.

Alan Noble made a lasting contribution to amateur radio and will be sadly missed from our fraternity.

He is survived by wife Pat, sons Rob and Alan (Jnr), and daughters Julie Ann and Shelley Francis.

**Jim Linton VK3PC  
ar**

## **■ Book Review**

# **THE EARLY HISTORY OF RADIO: from Faraday to Marconi**

*By G. R. M. Garrett  
Reviewed by Bill Rice VK3ABP*

**THE EARLY  
HISTORY OF  
RADIO  
from Faraday  
to Marconi**

**G R M Garrett**



Published Dec 1993 by the IEE (number 20 in the series IEE History of Technology) ISBN 0 85296 8450. 96 pages. Our copy direct from IEE. Price (in UK) 19 pounds sterling.

The Institution of Electrical Engineers  
in association with the Science Museum

The previous volume in this series (History of International Broadcasting) was reviewed in *Amateur Radio* in August 1993. A very friendly letter from its author (James Wood) was subsequently received, revealing, among other things, that he had held the amateur callsign of G3VG since 1938. Regrettably, this precedent cannot be followed in the case of Gerald Garratt, who was G5CS until his death in 1989 at the age of 83.

In fact, when he died, Gerald's book was unfinished, and we owe the final chapter (on Marconi) to his daughter Susan, who based it on a lecture given by him to a joint IEE-RSGB meeting in 1972. Reference has already been made to this book in my April 1994 editorial. I found it fascinating!

The book is divided into an introduction and six chapters, each of the latter being devoted to a particular radio/electrical pioneer. In sequence, the six are Faraday, Maxwell, Hertz,

Lodge, Popov and Marconi. All six are covered in only 83 pages, so there are few surplus words. Lodge has the most pages (20) and Popov the least (4). Many other names also appear (Davy, Oersted, Ampere, Henry, Kelvin, Hughes, Fitzgerald, Helmholtz, Preece, Muirhead, and

more)! Literally, the book displays a galaxy of 19th century researchers into mysteries which are now the essential infrastructure of the 20th century. If you have any interest at all in the history of radio you will find it as enthralling as I did!

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## Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

### Wirraway Radio

We have just completed the restoration of a 1940 Commonwealth Aircraft Corporation CA-3 "Wirraway" aircraft.

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Ed Field

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(There must be dozens of AT5/AR8 sets out there looking for a good home! Editor.)

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# HF PREDICTIONS

Evan Jarman VK3ANI

## The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for five of the bands between 7 and 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1  $\mu$ V (dBu) at the MUF; the fourth column lists the 'frequency of optimum travel' (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1  $\mu$ V in 50 ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50  $\mu$ V at the receiver's input and the S-meter scale is 6 dB per S-point.

| V in 50 ohms | S-points | dB( $\mu$ V) |
|--------------|----------|--------------|
| 5.00         | S9       | 34           |
| 25.00        | S8       | 28           |
| 12.50        | S7       | 22           |
| 6.25         | S6       | 16           |
| 3.12         | S5       | 10           |

|      |    |     |
|------|----|-----|
| 1.56 | S4 | 4   |
| 0.78 | S3 | 2   |
| 0.39 | S2 | -8  |
| 0.20 | S1 | -14 |

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

**VK EAST** The major part of NSW and Queensland.

**VK SOUTH** Southern-NSW, VK3, VK5 and VK7.

**VK WEST** The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used in these calculations is 17. The predicted value for June is 16.5.

## VK SOUTH — SOUTH PACIFIC

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 16.2 | 16  | 12.2 | 5   | 21   | 11   |      | -18  |
| 2   | 16.6 | 16  | 12.4 | 6   | 22   | 12   | 1    | -15  |
| 3   | 16.7 | 17  | 12.5 | 10  | 23   | 13   | 1    | -15  |
| 4   | 16.6 | 18  | 12.5 | 16  | 24   | 13   | 1    | -15  |
| 5   | 16.2 | 20  | 12.1 | 26  | 26   | 13   | 0    | -19  |
| 6   | 15.4 | 24  | 9.9  | 45  | 25   | 17   | -4   | -34  |
| 7   | 10.9 | 29  | 8.2  | 45  | 10   | -18  |      |      |
| 8   | 9.9  | 31  | 7.4  | 44  | 2    | -31  |      |      |
| 9   | 9.9  | 31  | 7.4  | 44  | 2    | -31  |      |      |
| 10  | 9.1  | 31  | 6.8  | 42  | -5   |      |      |      |
| 11  | 8.6  | 32  | 6.4  | 40  | -11  |      |      |      |
| 12  | 5.5  | 32  | 6.0  | 40  | -12  |      |      |      |
| 13  | 6.0  | 31  | 5.1  | 39  | -14  |      |      |      |
| 14  | 8.2  | 33  | 6.0  | 39  | -16  |      |      |      |
| 15  | 8.1  | 33  | 6.0  | 39  | -17  |      |      |      |
| 16  | 7.4  | 34  | 5.7  | 36  | -26  |      |      |      |
| 17  | 7.2  | 34  | 5.6  | 35  | -30  |      |      |      |
| 18  | 7.4  | 33  | 5.7  | 36  | -27  |      |      |      |
| 19  | 7.5  | 34  | 5.8  | 35  | -29  |      |      |      |
| 20  | 8.6  | 26  | 6.7  | 31  | -10  |      |      |      |
| 21  | 10.9 | 21  | 8.4  | 24  | 6    | -18  |      |      |
| 22  | 13.0 | 18  | 10.0 | 15  | 14   | -2   | -20  |      |
| 23  | 14.6 | 17  | 11.1 | 9   | 18   | 5    | -9   | -30  |
| 24  | 15.4 | 16  | 11.7 | 6   | 19   | 8    | -5   | -24  |

## VK WEST — SOUTH PACIFIC

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 18.9 | 13  | 14.3 | -19 | 18   | 14   | 8    | -3   |
| 2   | 19.9 | 13  | 14.9 | -21 | 19   | 16   | 10   |      |
| 3   | 20.4 | 14  | 15.8 | -19 | 20   | 17   | 11   | -2   |
| 4   | 20.5 | 14  | 15.4 | -13 | 21   | 18   | 6    | -2   |
| 5   | 20.4 | 15  | 15.3 | -12 | 20   | 13   | 0    | -2   |
| 6   | 19.3 | 17  | 14.5 | 15  | 28   | 21   | 12   | 0    |
| 7   | 17.1 | 21  | 13.0 | 31  | 29   | 18   | 6    | -9   |
| 8   | 14.9 | 24  | 11.2 | 41  | 27   | 11   | 1    | -3   |
| 9   | 12.9 | 27  | 9.7  | 43  | 22   | 3    | -15  |      |
| 10  | 11.9 | 29  | 7.7  | 43  | 17   | -1   | -26  |      |
| 11  | 10.8 | 31  | 8.1  | 44  | 14   | -11  | -34  |      |
| 12  | 10.4 | 31  | 7.7  | 44  | 11   | -15  |      |      |
| 13  | 10.2 | 31  | 7.6  | 43  | 10   | -17  |      |      |
| 14  | 10.0 | 32  | 7.4  | 43  | 9    | -19  |      |      |
| 15  | 9.9  | 32  | 7.4  | 43  | 8    | -20  |      |      |
| 16  | 9.8  | 32  | 7.4  | 43  | 7    | -21  |      |      |
| 17  | 8.9  | 33  | 6.8  | 41  | 1    | -30  |      |      |
| 18  | 8.7  | 33  | 6.7  | 40  | 0    | -33  |      |      |
| 19  | 9.0  | 33  | 6.9  | 41  | 2    | -30  |      |      |
| 20  | 9.1  | 27  | 7.0  | 32  | 1    | -28  |      |      |
| 21  | 10.6 | 22  | 7.8  | 22  | 8    | -13  | -35  |      |
| 22  | 9.4  | 17  | 7.3  | 9   | 16   | 2    | -12  | -32  |
| 23  | 16.0 | 15  | 12.3 | 4   | 18   | 0    | -15  |      |
| 24  | 17.9 | 14  | 13.7 | -14 | 18   | 13   | 6    | -6   |

## VK EAST — AFRICA

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 9.2  | 14  | 7.3  | 9   | 0    | -22  |      |      |
| 2   | 8.3  | 7   | 6.4  | 0   | -34  |      |      |      |
| 3   | 8.0  | 7   | 6.2  | -8  | -4   | -25  |      |      |
| 4   | 10.5 | 3   | 8.1  | -21 | 3    | -9   | -23  |      |
| 5   | 10.7 | 7   | 7.4  | -17 | 7    | -7   | -17  |      |
| 6   | 17.4 | 7   | 13.6 | -8  | 6    | -1   | -17  |      |
| 7   | 16.9 | 8   | 11.4 | -36 | 7    | 1.9  | -17  |      |
| 8   | 15.2 | 8   | 11.4 | -36 | 8    | 4    | -16  |      |
| 9   | 13.2 | 8   | 9.9  | -23 | 8    | 0    | -11  | -27  |
| 10  | 11.5 | 8   | 8.6  | -13 | 6    | -6   | -20  |      |
| 11  | 10.2 | 8   | 7.5  | -3  | 11   | 1    | -30  |      |
| 12  | 9.6  | 13  | 7.1  | 2   | -17  | -38  |      |      |
| 13  | 9.4  | 18  | 7.0  | 17  | 2    | -20  |      |      |
| 14  | 9.3  | 25  | 6.8  | 29  | 2    | -24  |      |      |
| 15  | 9.1  | 26  | 6.7  | 33  | 2    | -26  |      |      |
| 16  | 9.0  | 29  | 6.7  | 32  | 1    | -31  |      |      |
| 17  | 8.9  | 30  | 6.7  | 37  | 0    | -31  |      |      |
| 18  | 8.8  | 30  | 6.6  | 36  | -1   | -33  |      |      |
| 19  | 8.3  | 31  | 6.4  | 35  | -4   | -37  |      |      |
| 20  | 8.4  | 31  | 6.5  | 36  | -4   | -37  |      |      |
| 21  | 8.4  | 30  | 6.5  | 35  | -4   | -38  |      |      |
| 22  | 8.3  | 30  | 6.4  | 35  | -4   | -38  |      |      |
| 23  | 7.9  | 24  | 6.2  | 26  | -8   | -22  |      |      |
| 24  | 8.1  | 17  | 6.4  | 17  | -6   | -36  |      |      |

## VK SOUTH — AFRICA

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 9.1  | 21  | 6.9  | 22  | 6.0  | 2    | -23  |      |
| 2   | 8.8  | 17  | 6.8  | 14  | 0    | -24  |      |      |
| 3   | 11.2 | 15  | 8.3  | 5   | 9    | -6   | -22  |      |
| 4   | 11.2 | 14  | 8.3  | 5   | 10   | -1   | -22  |      |
| 5   | 17.3 | 11  | 10.0 | -27 | 10   | 3    | 8    |      |
| 6   | 18.0 | 10  | 14.5 | -35 | 11   | 0    | -4   |      |
| 7   | 17.4 | 9   | 14.0 | -36 | 11   | 8    | -2   |      |
| 8   | 16.2 | 10  | 12.9 | -28 | 11   | 7    | -1   | -14  |
| 9   | 14.5 | 11  | 10.5 | -19 | 10   | 3    | -7   | -22  |
| 10  | 12.7 | 11  | 10.0 | -10 | 8    | -16  | -36  |      |
| 11  | 11.7 | 11  | 9.7  | -10 | 7    | -27  |      |      |
| 12  | 9.9  | 13  | 7.7  | 2   | -16  |      |      |      |
| 13  | 9.3  | 13  | 7.2  | 16  | 0    | -25  |      |      |
| 14  | 8.9  | 24  | 6.9  | 28  | 2    | -32  |      |      |
| 15  | 8.8  | 27  | 6.7  | 32  | 3    | -35  |      |      |
| 16  | 8.7  | 29  | 6.6  | 35  | 4    | -38  |      |      |
| 17  | 8.5  | 30  | 6.5  | 35  | 5    | -37  |      |      |
| 18  | 8.4  | 20  | 8.0  | 33  | 11   | -11  |      |      |
| 19  | 8.4  | 30  | 6.6  | 35  | -7   | -35  |      |      |
| 20  | 8.7  | 22  | 6.7  | 36  | -3   | -35  |      |      |
| 21  | 8.7  | 23  | 6.7  | 36  | -10  | -38  |      |      |
| 22  | 8.7  | 24  | 6.7  | 36  | -10  | -38  |      |      |
| 23  | 10.8 | 24  | 22   | 6.8 | 36   | -10  | -38  |      |
| 24  | 10.7 | 24  | 22   | 6.8 | 36   | -10  | -38  |      |

## VK WEST — AFRICA

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 17.3 | 10  | 13.1 | -35 | 12   | 9    | 2    | -9   |
| 2   | 16.8 | 10  | 13.7 | -37 | 12   | 10   | 5    | -5   |
| 3   | 16.8 | 11  | 13.0 | -31 | 12   | 6    | 3    | -3   |
| 4   | 16.7 | 11  | 14.1 | -38 | 13   | 12   | 7    | -3   |
| 5   | 18.7 | 11  | 14.1 | -38 | 13   | 12   | 6    | -3   |
| 6   | 18.2 | 11  | 14.1 | -38 | 13   | 12   | 6    | -4   |
| 7   | 17.1 | 13  | 12.9 | -16 | 17   | 11   | 3    | -10  |
| 8   | 15.4 | 14  | 12.9 | -14 | 17   | 11   | 0    | -18  |
| 9   | 15.4 | 16  | 11.6 | -18 | 18   | 8    | -4   | -22  |
| 10  | 11.7 | 20  | 10.1 | -30 | 10   | 7    | -18  | -38  |
| 11  | 10.3 | 24  | 7.4  | 37  | 0    | -31  |      |      |
| 12  | 9.6  | 25  | 7.2  | 37  | -6   |      |      |      |
| 13  | 9.5  | 26  | 7.1  | 38  | -8   |      |      |      |
| 14  | 9.3  | 26  | 6.9  | 37  | -11  |      |      |      |
| 15  | 9.1  | 26  | 6.8  | 37  | -13  |      |      |      |
| 16  | 9.0  | 26  | 6.8  | 37  | -13  |      |      |      |
| 17  | 9.0  | 26  | 6.8  | 37  | -13  |      |      |      |
| 18  | 8.8  | 26  | 6.7  | 36  | -17  |      |      |      |
| 19  | 8.0  | 26  | 6.2  | 30  | -30  |      |      |      |
| 20  | 7.7  | 26  | 6.0  | 30  | -37  |      |      |      |
| 21  | 9.5  | 26  | 7.4  | 36  | -10  |      |      |      |
| 22  | 10.4 | 24  | 14.0 | 9   | -8   | -26  |      |      |
| 23  | 10.4 | 24  | 14.0 | 9   | -8   | -26  |      |      |
| 24  | 10.4 | 24  | 14.0 | 9   | -8   | -26  |      |      |

## VK WEST — ASIA

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 20.2 | 14  | 15.5 | -23 | 19   | 17   | 11   | -2   |
| 2   | 19.9 | 14  | 15.9 | -32 | 18   | 17   | 12   | 3    |
| 3   | 19.9 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 4   | 19.7 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 5   | 19.7 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 6   | 19.5 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 7   | 19.5 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 8   | 19.5 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 9   | 19.5 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
| 10  | 19.5 | 14  | 15.4 | -32 | 18   | 17   | 11   | -2   |
|     |      |     |      |     |      |      |      |      |

**VK EAST — EUROPE**

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 | UTC  | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |      |     |     |     |     |     |     |     |
|-----|------|-----|------|-----|------|------|------|------|------|------|-----|------|-----|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| 1   | 10.7 | -6  | 7.7  | ... | -1   | -4   | -14  | -30  | 2    | 11.0 | 0   | 7.7  | -37 | 3    | -4   | -15  | -33  |      |     |     |     |     |     |     |     |
| 3   | 11.5 | -7  | 8.3  | ... | -2   | 0    | -5   | -15  | 4    | 13.7 | -1  | 9.5  | ... | 0    | 1    | -3   | -24  |      |     |     |     |     |     |     |     |
| 4   | 13.1 | -4  | 9.2  | ... | -2   | 0    | -5   | -15  | 5    | 16.1 | 1   | 11.4 | ... | -3   | 3    | 1    | -6   |      |     |     |     |     |     |     |     |
| 6   | 16.6 | 2   | 12.2 | ... | -4   | 3    | 1    | -4   | 6    | 17.8 | 3   | 12.6 | ... | -4   | 3    | 3    | -1   |      |     |     |     |     |     |     |     |
| 7   | 17.4 | 3   | 12.7 | ... | -2   | 2    | 4    | 3    | 8    | 18.0 | 5   | 13.4 | ... | -4   | 4    | 0    | -9   |      |     |     |     |     |     |     |     |
| 9   | 17.1 | 0   | 13.0 | ... | 4    | 6    | 3    | -5   | 9    | 16.2 | 1   | 1    | 4   | 1    | -5   | 3    | -2   |      |     |     |     |     |     |     |     |
| 10  | 14.9 | 7   | 11.4 | ... | 6    | 4    | -2   | -14  | 10   | 14.1 | 3   | 10.6 | ... | 3    | 2    | -4   | -16  |      |     |     |     |     |     |     |     |
| 11  | 13.0 | 7   | 9.9  | -29 | 7    | 1    | -9   | -25  | 11   | 12.3 | 3   | 9.2  | -38 | 5    | -1   | -11  | -27  |      |     |     |     |     |     |     |     |
| 12  | 11.9 | 9   | 9.0  | -15 | 8    | -3   | -16  | -36  | 12   | 10.9 | 4   | 8.1  | -22 | 4    | -6   | -20  | ...  |      |     |     |     |     |     |     |     |
| 13  | 11.4 | 12  | 8.6  | -3  | 8    | -5   | -21  | ...  | 13   | 10.2 | 9   | 7.6  | -6  | 4    | -11  | -29  | ...  |      |     |     |     |     |     |     |     |
| 14  | 10.9 | 5   | 8.3  | 8   | -4   | -26  | ...  | 14   | 10.1 | 5    | 5   | -14  | -34 | 14   | 6    | 9    | -23  |      |     |     |     |     |     |     |     |
| 15  | 10.6 | 20  | 8.8  | -11 | 8    | -11  | -32  | ...  | 15   | 9.9  | 19  | 7.3  | -17 | 5    | -17  | -39  | ...  |      |     |     |     |     |     |     |     |
| 16  | 10.5 | 25  | 7.9  | 30  | 9    | -14  | -37  | ...  | 16   | 9.7  | 25  | 7.2  | 29  | 4    | -21  | ...  | 16   | 10.9 | 24  | 8.2 | 30  | 10  | -13 | -34 |     |
| 17  | 10.5 | 27  | 8.0  | 35  | 10   | -14  | -37  | ...  | 17   | 9.7  | 27  | 7.2  | 34  | 5    | -22  | ...  | 17   | 10.7 | 26  | 8.1 | 35  | 9   | -15 | -39 |     |
| 18  | 9.9  | 29  | 7.6  | 38  | 6    | -21  | ...  | 18   | 9.7  | 29   | 7.3 | 37   | 5   | -23  | ...  | 18   | 10.5 | 27   | 7.9 | 38  | 8   | -17 | ... |     |     |
| 19  | 8.6  | 30  | 6.6  | 35  | 4    | -37  | ...  | 19   | 9.5  | 29   | 7.2 | 38   | 3   | -25  | ...  | 19   | 10.6 | 27   | 8.0 | 39  | 9   | -16 | ... |     |     |
| 20  | 8.3  | 30  | 5.4  | 35  | 4    | -37  | ...  | 20   | 8.9  | 29   | 7.1 | 38   | 1   | -33  | ...  | 20   | 10.7 | 27   | 8.1 | 39  | 8   | -16 | ... |     |     |
| 21  | 10.3 | 40  | 10   | 18  | 1    | -13  | -36  | ...  | 21   | 8.9  | 30  | 7.9  | 38  | 3    | -33  | ...  | 21   | 9.0  | 28  | 6.9 | 36  | 2   | -35 | ... |     |
| 22  | 10.2 | 24  | 7.7  | 12  | 9    | -12  | -33  | ...  | 22   | 9.7  | 30  | 7.5  | 38  | 7    | -20  | ...  | 22   | 8.8  | 29  | 6.8 | 35  | 4   | -38 | ... |     |
| 23  | 11.9 | 15  | 8.4  | -2  | 12   | 0    | -14  | -34  | 23   | 9.8  | 26  | 7.5  | 30  | 7    | -17  | ...  | 23   | 9.6  | 29  | 7.4 | 38  | 3   | -25 | ... |     |
| 24  | 11.3 | 5   | 8.0  | 24  | 6    | -3   | -15  | -34  | 24   | 11.8 | 18  | 8.2  | 9   | 13   | 0    | -15  | -37  | 24   | 9.4 | 27  | 7.2 | 33  | 2   | -27 | ... |

**VK EAST — EUROPE (Long path)**

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 | UTC  | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|------|------|-----|------|-----|------|------|------|------|
| 1   | 13.1 | 8.9 | -3   | 14  | 3    | -9   | -27  | 2    | 12.4 | 16   | 8.1 | 4    | 11  | -1   | -14  | -34  |      |
| 2   | 12.3 | 17  | 8.3  | 5   | 14   | 3    | -9   | -27  | 2    | 11.6 | 16  | 8.1  | 4   | 11   | -1   | -14  | -34  |
| 3   | 11.6 | 7   | 7.9  | 13  | 14   | 0    | -14  | -34  | 3    | 10.0 | 17  | 7.5  | 15  | 12   | -4   | -26  | ...  |
| 4   | 11.1 | 24  | 7.7  | 27  | 15   | -2   | -19  | ...  | 4    | 10.7 | 24  | 7.5  | 26  | 7    | -2   | -25  | ...  |
| 5   | 10.9 | 25  | 8.2  | 30  | 18   | -1   | -14  | -36  | 5    | 10.7 | 24  | 7.5  | 26  | 7    | -2   | -25  | ...  |
| 6   | 11.8 | 25  | 8.2  | 30  | 18   | -1   | -14  | -36  | 6    | 11.5 | 25  | 8.2  | 30  | 16   | -1   | -18  | ...  |
| 7   | 12.7 | 24  | 9.4  | 28  | 20   | 5    | -8   | -28  | 7    | 12.9 | 22  | 9.2  | 28  | 18   | 3    | -11  | -32  |
| 8   | 11.2 | 19  | 8.6  | 13  | 13   | -1   | -16  | -38  | 8    | 11.4 | 18  | 8.9  | 15  | 11   | -5   | -22  | ...  |
| 9   | 9.1  | 10  | 7.0  | 0   | 4    | -13  | -30  | ...  | 9    | 10.1 | 13  | 7.9  | 4   | 4    | -12  | -30  | ...  |
| 10  | 8.8  | 0   | 6.8  | -3  | 2    | -2   | -12  | -28  | 10   | 9.3  | 12  | 7.6  | -2  | -14  | -30  | ...  |      |
| 11  | 9.9  | -1  | 7.3  | -26 | 2    | -2   | -12  | -28  | 11   | 9.1  | 7   | 7.1  | -16 | 0    | -14  | -30  | ...  |
| 12  | 9.7  | -1  | 7.3  | -36 | 1    | -1   | -17  | -37  | 12   | 9.1  | 5   | 6.9  | -24 | 0    | -12  | -27  | ...  |
| 13  | 9.6  | -12 | 7.0  | ... | 0    | -6   | -17  | -34  | 13   | 8.9  | -10 | 7.0  | -31 | 0    | -10  | -24  | ...  |
| 14  | 9.5  | -15 | 7.0  | ... | 0    | -6   | -15  | -31  | 14   | 8.8  | -15 | 6.7  | -37 | 0    | -9   | -21  | ...  |
| 15  | 9.4  | -17 | 7.0  | ... | 0    | -5   | -14  | -29  | 15   | 8.7  | -27 | 6.7  | -37 | 6    | -14  | -26  | ...  |
| 16  | 9.2  | -21 | 6.9  | ... | -2   | -6   | -16  | -31  | 16   | 8.5  | -6  | 6.6  | -36 | 6    | -14  | -26  | ...  |
| 17  | 8.8  | -33 | 6.6  | ... | -7   | -13  | -24  | ...  | 17   | 8.2  | -6  | 6.4  | -36 | 9    | -17  | -30  | ...  |
| 18  | 8.6  | -30 | 6.6  | ... | -7   | -13  | -24  | ...  | 18   | 8.4  | -6  | 6.4  | -36 | 9    | -17  | -30  | ...  |
| 19  | 10.2 | -13 | 4.6  | ... | -6   | -11  | -27  | -39  | 19   | 9.6  | -25 | 7.3  | -33 | 6    | -10  | -20  | -35  |
| 20  | 12.8 | -2  | 9.9  | ... | -4   | -14  | -15  | -27  | 20   | 11.7 | -9  | 9.3  | -33 | 2    | -9   | -21  | ...  |
| 21  | 15.4 | 5   | 11.8 | ... | 3    | 4    | -8   | -10  | 21   | 14.0 | -2  | 11.2 | -1  | -1   | 0    | -4   | -14  |
| 22  | 15.9 | 10  | 10.9 | ... | 9    | 8    | -3   | -6   | 22   | 14.9 | 2   | 10.5 | 1   | 3    | 0    | -9   | -19  |
| 23  | 14.9 | 12  | 10.1 | -23 | 12   | 8    | -1   | -10  | 23   | 14.0 | 4   | 9.8  | 3   | 3    | -2   | -13  | -13  |
| 24  | 13.9 | 14  | 9.4  | -12 | 13   | 7    | -2   | -15  | 24   | 13.1 | 8   | 9.1  | -27 | 8    | 3    | -5   | -19  |

**VK EAST — MEDITERRANEAN**

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 | UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |      |     |     |    |     |     |     |
|-----|------|-----|------|-----|------|------|------|------|-----|------|-----|------|-----|------|------|------|------|------|-----|-----|----|-----|-----|-----|
| 1   | 11.8 | 6   | 8.9  | -3  | 6    | -1   | -13  | -31  | 1   | 11.7 | 13  | 8.9  | -5  | 10   | -2   | -16  | -31  |      |     |     |    |     |     |     |
| 2   | 11.6 | 10  | 8.9  | ... | 3    | -1   | -11  | -26  | 2   | 11.4 | 13  | 8.9  | -5  | 10   | -2   | -16  | -31  |      |     |     |    |     |     |     |
| 3   | 15.0 | 3   | 11.2 | ... | 3    | -1   | -11  | -26  | 3   | 14.9 | 5   | 11.7 | -3  | 4    | -2   | -16  | -32  |      |     |     |    |     |     |     |
| 4   | 19.3 | 6   | 14.6 | ... | 1    | -6   | 5    | -5   | 4   | 19.5 | 7   | 14.8 | ... | 2    | -7   | 4    | -17  |      |     |     |    |     |     |     |
| 5   | 22.0 | 7   | 17.0 | ... | -2   | 7    | 8    | 5    | 5   | 20.7 | 7   | 15.5 | ... | 0    | 7    | 6    | -2   |      |     |     |    |     |     |     |
| 6   | 22.4 | 7   | 17.0 | ... | -3   | 6    | 7    | 4    | 6   | 20.5 | 6   | 15.4 | ... | -1   | 6    | 6    | -1   |      |     |     |    |     |     |     |
| 7   | 21.3 | 6   | 16.1 | ... | -1   | 6    | 6    | 2    | 5   | 19.9 | 6   | 14.9 | ... | -1   | 5    | 5    | 0    |      |     |     |    |     |     |     |
| 8   | 19.4 | 6   | 16.7 | ... | 1    | 7    | 5    | 0    | 8   | 18.5 | 5   | 12.5 | ... | 3    | 6    | 6    | -1   |      |     |     |    |     |     |     |
| 9   | 17.0 | 7   | 17.9 | ... | 4    | 6    | 6    | -5   | 9   | 16.5 | 5   | 12.5 | ... | 3    | 5    | 5    | -4   |      |     |     |    |     |     |     |
| 10  | 14.9 | 7   | 11.3 | ... | 7    | 4    | -3   | -15  | 10  | 14.4 | 5   | 10.8 | 5   | 5    | -2   | -17  | -17  |      |     |     |    |     |     |     |
| 11  | 13.0 | 8   | 9.8  | -27 | 8    | 0    | -10  | -27  | 11  | 12.6 | 5   | 9.4  | -32 | 5    | -1   | -12  | -27  |      |     |     |    |     |     |     |
| 12  | 12.0 | 11  | 9.0  | -11 | 8    | -3   | -16  | -37  | 12  | 11.1 | 8   | 8.3  | -13 | 5    | -7   | -23  | ...  |      |     |     |    |     |     |     |
| 13  | 11.6 | 15  | 8.7  | 4   | 10   | -5   | -21  | ...  | 13  | 10.5 | 13  | 7.8  | 2   | 5    | -12  | -31  | ...  |      |     |     |    |     |     |     |
| 14  | 11.2 | 20  | 8.4  | 18  | 11   | -7   | -30  | ...  | 14  | 10.3 | 15  | 7.6  | 16  | 0    | -36  | 14   | 11.5 | 20   | 8.4 | 18  | 0  | -17 | ... |     |
| 15  | 10.9 | 25  | 8.3  | 17  | 12   | -6   | -30  | ...  | 15  | 10.1 | 25  | 8.2  | -29 | 18   | -16  | 15   | 10.2 | 23   | 7.7 | 30  | 5  | -21 | ... |     |
| 16  | 10.8 | 27  | 8.2  | 17  | 12   | -5   | -33  | ...  | 16  | 9.9  | 26  | 7.3  | 34  | 5    | -21  | ...  | 16   | 10.0 | 25  | 7.5 | 34 | 3   | -24 | ... |
| 17  | 10.8 | 28  | 8.2  | 19  | 12   | -11  | -33  | ...  | 17  | 9.9  | 28  | 7.3  | 37  | 5    | -22  | ...  | 17   | 9.8  | 27  | 7.4 | 37 | 2   | -27 | ... |
| 18  | 10.3 | 29  | 7.8  | 39  | 9    | -15  | ...  | 18   | 9.8 | 29   | 7.4 | 38   | 5   | -22  | ...  | 18   | 9.7  | 28   | 7.3 | 38  | 2  | -28 | ... |     |
| 19  | 9.2  | 30  | 7.0  | 37  | 2    | -28  | ...  | 19   | 9.6 | 29   | 7.3 | 38   | 4   | -25  | ...  | 19   | 9.7  | 28   | 7.4 | 38  | 2  | -28 | ... |     |
| 20  | 8.9  | 30  | 6.9  | 37  | 0    | -31  | ...  | 20   | 9.1 | 29   | 6.9 | 37   | 0   | -31  | ...  | 20   | 9.4  | 28   | 7.1 | 37  | 1  | -33 | ... |     |
| 21  | 10.0 | 27  | 7.7  | 34  | 0    | -15  | -39  | ...  | 21  | 9.4  | 29  | 7.2  | 37  | 2    | -27  | ...  | 21   | 8.4  | 28  | 6.5 | 35 | 11  | -9  | ... |
| 22  | 10.0 | 27  | 7.6  | 34  | 0    | -15  | -39  | ...  | 22  | 9.0  | 27  | 7.0  | 37  | 1    | -31  | ...  | 22   | 8.4  | 28  | 6.5 | 35 | 11  | -11 | ... |
| 23  | 10.0 | 19  | 7.6  | 15  | -6   | -14  | -35  | ...  | 23  | 9.0  | 27  | 7.0  | -1  | -31  | ...  | 23   | 9.2  | 28   | 7.1 | 37  | 1  | -33 | ... |     |
| 24  | 13.1 | 15  | 10.0 | -5  | 14   | 4    | -7   | -24  | 24  | 12.7 | 20  | 9.6  | 16  | 1    | -15  | -37  | 24   | 9.1  | 28  | 7.0 | 35 | 2   | -34 | ... |

**VK EAST — USA/CARIBBEAN**

| UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 | UTC | MUF  | dBu | FOT  | 7.1 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|-----|------|-----|------|-----|------|------|------|------|
| 1   | 2.26 | 8   | 1.1  | -1  | 3    | -4   | -10  | -30  | 2   | 2.21 | 12  | 5.8  | -1  | 12   | -4   | 12   | -30  |
| 3   | 2.24 | 11  | 7.3  | 1   | 10   | -4   | -12  | ...  | 3   | 2.21 | 12  | 5.8  | -1  | 12   | -4   | 12   | -30  |
| 5   | 2.23 | 14  | 16.3 | -33 | 17   | 17   | 13   | 5    | 4   | 19.3 | 15  | 15.3 | -5  | 26   | 11   | 13   | -31  |
| 4   | 18.3 | 14  | 16.6 | -3  | 12   | 18   | 11   |      |     |      |     |      |     |      |      |      |      |

# HAMADS

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  - ICOM 725 solid state digital 100 W HF transceiver \$750; KENWOOD AT250 automatic antenna tuner with 4 antenna inputs \$400. Both radio and tuner in very good condition and original boxes. Ernest (02) 906 2628 BH.
  - ICOM AH2A automatic antenna tuner suitable for IC735 or earlier models that have CI-V interface or 24 pin accessory socket. New in carton, \$500 or will exchange for any of following in good unmodified condition, Type "A" MK3, Type 3 MK2, HRO rcvr, General Radio impedance bridge, marine shipboard rcvr circa 1930/40 or W/H/Y. Bill VK2FKE QTHR (043) 43 2339 Fax (043) 43 2036.
- SATTRACKER satellite antennas 2 m and 70 cm plus Kenpro 5400A dual rotator, \$1250 the lot. David VK2BDT QTHR (048) 21 5036.
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- TOWER 16 m two section winch-up guyed triangular by Hills, meets AS standards, on the ground ready to go, good cond, specs faxed to you on request, \$650 ono. Michael VK2ETM QTHR (02) 980 7392.
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- VALVES, old 2 volt battery, pins and octal; 2.5 volt; 6.3 pins; 79 types; Metal; Loctal; English; Regulators: Philips P base and octal, 2, 4, and 6.3 volt; 7Q types; Vibrators. Also Antique from RH1 on. TELEPHONES, older types, any collectors? Write if interested. Chas VK3DS QTHR.
- EX-ARMY HD gal tower, 15 m in 8 sections, rotator, 4 el mono yagi, 20 m, 8 m boom, inducto match, balun, coax, guys, anchor plates (3), \$600. Buyer to dismantle. W Timmermans VK3BYQ QTHR.
- US NAVY Tx-Rx type CRM43046, model MQ2, manuf'd 1943, octal valves, 2000-3500 kcs, weighs 70 lbs, buyer must collect, \$25. Ken VK3JII QTHR (03) 580 5347.
- VINTAGE items. SBE-34 TXCVR S/N 177578; BC221 Freq meter; TCA 1649A car phone s/n 638; SIGNAL generator valve type; XTALS and old parts, magazines, ARA, EA and other older books. Wal VK3WD QTHR (054) 35 2274.
- DRAKE TR7 transceiver, excellent condition, complete with workshop manual and MC50 desk mic, \$750 ono; CUSHCRAFT 2x10 el crossed 2 meter yagi on 3 m boom complete with phasing harness for RH or LH circular polarisation, \$250 ono; STAR LC24-15, multifont, 15" wide, 24 pin dot matrix printer, never used, plus box tractor feed and packet single sheet paper, cost \$780, sell \$500 ono. Harold VK3AFQ QTHR (03) 596 2414.
- FREE FOR PICK-UP, AR Jan 1990 to Dec 1994. Ring VK3GI (054) 27 2576.
- KENWOOD TS440S/AT, clean, \$1400; ICOM IC2400A 2 m/70 cm mobile, \$900; ICOM IC575A with CWF, hi-stat osc, \$1700; TOKYO HL1K/6 linear 10 W/500 W PEP \$1400; YAESU FT690R with leather case, YAESU FRDX400 receivers (2), FLDX400 transmitter, \$150 each. Mike VK3RZ 018 397 565.

## FOR SALE QLD

- YAESU FT101ZD analog, s/n 9R100607, as new, overhauled with test report, spare 4-6146B's. 12BY7, original packing case, \$400. Percy VK4CPA QTHR (075) 73 1234.
- HY-GAIN antenna tower, 60 ft, 3-stage, 13.5 inch triangular base, Hy-gain TH7-DXX HF 7 element tribander with refurbish kit, prop-pitch motors 28 V, insulators, turnbuckles, etc. Offers part or whole. Hadgraft, 17 Paxton St, Holland Park Qld 4121, (07) 397 3751.

- KENWOOD TS130SE HF transceiver, \$650; KENWOOD R2000 receiver, \$550. Both vgc, includes manuals. Alan VK4KDD QTHR (074) 67 3271.

- VALVES for restorers, amateurs, collectors. Octals, novals, metals, 5 stars. All tested. Sockets. Transmitting ceramics. Reduced prices. Send 9" x 4" SASE for list. Ted VK4YG, PO Box 245 Ravenshoe, QLD 4872. (070) 976 387.

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- REALISTIC HTX-404 430-450 MHz (70cm) hand held transceiver, s/n 0064739, 12 memories, CTCSS and DTMF encode, good condition, price \$350. Andrew VK7XR QTHR (004) 24 8322 BH only.

## WANTED NSW

- KENWOOD TS-711, must be in as new condition, plus at least 60 watt plus amp with GasFet, manuals, boxes etc; BENCH magnifier with fluorescent round light with approx 12 cm round lens, overall disk approx 23cm, large size not small Dick Smith type. A Walsh VK2TBW (048) 61 2092.

- MORSE keys and bugs wanted by collector. Have keys to swap with other collectors. Ring Steve VK2SPS (02) 9999 2933 after 6.00 pm.

- KYOKUTO FM144 105XR or similar in good operating condition, will pay around \$110 for good unit. Trevor VK2TM (047) 39 5823 anytime.

- COPY hand book for Marconi sig gen model TF144G, all copying and postage costs plus \$20 for your trouble. Also need MU14 (Rectifier) and ML4 (Triode) for same model. Bill VK2FKE QTHR (043) 43 2339 fax (043) 43 2036.

## WANTED VIC

- YAESU FRG7 communications receiver or similar for handicapped SWL with depression problems. Ron VK3LPM (053) 68 9477.

- GERMANIUM diode, glass tube "cats whisker" type to complete restoration of old crystal set. Tony VK3CTM, PO Box 192, Strathfieldsay VIC 3551.

- YAESU maintenance service manual for FT101B series, FTS 12 tone squelch unit (CTCSS) for FT211RH. Andrew VK3WAB (03) 544 2758.

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